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Conservative Buying

But Political Factors Are Not Feared

Steel Corporation Production Growing Faster Than That of Independent Companies

Some hesitancy has been noticed in iron and steel markets in the past week, attributable to political developments, and it has helped to emphasize the conservatism which buyers are showing in all lines. But leading steel manufacturers consider that the programme for the extra session of Congress, limiting tariff action to two schedules, is not one that should cause more than a temporary halt, and they are not uneasy.

Pig iron production increased steadily in February. The total of coke and anthracite iron for the 28 days was 1,794,509 tons, or 64,090 tons a day, against 56,752 tons a day in January, a gain of 13 per cent. The number of active steel works furnaces increased by 17 in the month, while there was a net loss of one in active merchant furnaces. The daily capacity of the 222 furnaces in blast March 1 was 66,562 tons, against 59,568 tons a day for 206 furnaces February 1. Production to-day, including charcoal iron, is at the rate of 24,450,000 tons a year, against a rate of 22,000,000 tons a year February 1 and 19,700,000 tons at the low point at the opening of the year. The high rate of 1910 was 31,600,000 tons in February.

The United States Steel Corporation has blown in one New Castle, one Ensley and one Clairton furnace since March 1, and when one more furnace in the Pittsburgh district is blown in this week, will have 68 per cent. of capacity active, against 46½ per cent. January 1. Its stocks have been cut down to 100,000 tons at its Northern furnaces.

The scale of the Steel Corporation's operations is plainly in closer relation to that of independent steel companies than was the case two and three months ago. With prices better maintained it is apparently getting a larger share of the business. Its heavy foreign shipments are also a factor. In the 22 business days of February it booked new orders at an average daily rate of 40,775 tons. Shipments were about 20 per cent. greater than in January. The gain in unfilled orders will probably be between 200,000 and 300,000 tons.

In rails a 17,000-ton purchase to be closed this week by the Pere Marquette is the chief item. The Nickel Plate has divided 5000 tons between South Chicago and Buffalo, and the New York, West Chester & Boston has placed 6000 tons at Sparrows Point. The Manila Railroad has bought 10,000 tons from the Lackawanna Steel Company.

The sold up condition of Canadian mills makes it certain that Canadian railroads will place considerable orders in this country. The Canadian Pacific has awarded 100,000 tons and the Transcontinental 62,000

tons to the Algoma and Dominion companies. The former road will want 25,000 tons more and the Canadian Northern is yet to buy.

The Steel Corporation decided this week that no more wooden ties will be bought for renewals on its 3500 miles of railroads. Its Bessemer railroad has placed a good sized order for steel ties.

The expected advance of $1 a ton in wire products was made March 4, bringing wire nails to $1.80 and plain wire to $1.60, Pittsburgh. The important spring buying was over before it came.

New demand for bars is coming out slowly. Buying by jobbers is restricted somewhat, as there is some doubt as to the ultimate effect on their business of the warehouse policy of the leading interest.

Pig iron has been quieter at Chicago and Pittsburgh, but more active at Cincinnati, Buffalo and in eastern Pennsylvania. Prices are firm at recent minimums, and slight advances have been secured for deliveries beyond July 1. Southern iron has sold at $11 for third quarter, but $11.25 has also been obtained. Philadelphia reports sales of 15,000 tons of basic at $15 for second quarter, and $15.25 for third quarter; also 15,000 tons of Southern pipe iron on the basis of $11 for No. 2.

The copper statistics show an increase of 14,000,000 lb. in stocks last month. The market is weaker and sales of electrolytic were made at 12.25c. for early delivery, though contracts for later deliveries are reported at 12.37½c.

In addition to the large requisition for a Southern plant, recently reported, several Steel Corporation subsidiaries are about to make heavy purchases of machine tools.

The Rate Decisions and Other Price Questions

In connection with the freight rate decisions the point has been made that they definitely put an end to wage advances to railroad employees and no doubt headed off wage demands in iron and steel and other industries. Ever since the sanction given the anthracite miners' claim that the operators should not withhold wage advances, since these could be recouped by simply adding them to the price of coal, the country has been traveling a seemingly unending spiral of advancing prices. There was bitter complaint from time to time of the prices paid for commodities, and the cupidity of various producers, middlemen, combines and trusts was assailed in the press and by orators in high places. Legislation of various sorts was urged, the remedy most advocated being the lowering or removal of tariffs on certain imports.

But never in all the years of rebellion against the high cost of living in this country has anything occurred that has borne so heavily against high prices as these decisions of the Interstate Commerce Commission. While they touch only certain proposed tariffs of the railroads, they have a moral effect upon the whole vexed question of prices and profits that is great and far reaching. Not only do they suggest that the efforts of labor must now be directed toward greater efficiency rather than continually toward higher rates, but they address themselves equally to the very shippers who were actively opposing the raising of rates. It is not unlikely that the railroads, which have raised a question as to the high prices of the things they buy, referring particularly to certain iron and steel products and the equipment into which these enter, will some day bring prominently before the country the fairness of the level of iron and steel prices. Since the best customers of the iron trade must give a reason for the price of what they sell, and must reduce that price when the Government's tribunal says it is excessive, more and more will public attention be directed to the relation of the railroads' costs to the level of their charges to the public.

The bearing of such a condition upon the iron and steel market should not be overlooked in canvassing the effects of the recent decisions. It points definitely in the direction of moderate levels for iron and steel and the avoidance of such advances as will limit consumption and, as has often happened, give way to unprofitably low levels. In other words, one of the later and less obvious effects of the check to freight rate advances may prove to be quite in line with the aims of the co-operative movement among manufacturers of iron and steel—namely, the prevention of sharp fluctuations and the maintenance of a more stable level of prices.

A Railroad Educational Bureau

The Union Pacific Railroad, after a year's preliminary trial, has established a permanent educational bureau for its employees, modeled along the lines of the more successful correspondence schools. A marked advantage that the students of the Union Pacific bureau have, however, is that they can apply their knowledge as they acquire it to practical work. There are very few books of actual value treating on railroad operation and management, and the average railroad man ambitious to learn is obliged to depend for his advancement largely on the knowledge he can pick up during his working hours.

About a year ago the company established a Bureau of Information and employees were notified that questions relating to railroad matters would be answered. The response was so great that the work of the bureau grew rapidly until those in charge were obliged to prepare printed matter covering certain lines of much desired information. From this the bureau grew until now the company has a well-organized teaching force and is issuing to the students properly compiled text books. The remarkable success of the scheme is illustrated by the fact that more than 80 per cent. of the employees have taken advantage of the opportunity offered for qualifying for better positions.

There are 29 courses of instruction, and the number is being increased. They include a block signal course, where the principles of electricity and magnetism are taught; an electrical course for shop employees, a railroad accounting course, freight and passenger traffic courses and a general course for candidates for positions, such as train master, yard superintendent, &c. The bureau also teaches by correspondence locomotive engineering, mechanical drawing, boilermaking, shop practice and other lines. One course, called the track course, has been translated into Japanese for the use of Japanese section foremen and track laborers, of whom the Union Pacific employs about 900. The students who average a good percentage in that grade can advance themselves further by taking up the study of railroad civil engineering.

In correcting the students' papers, writing, spelling, grammar and punctuation are not criticised except where the student is qualifying for a position that calls for clerical training. The text books are all illustrated from photographs taken in the company's shops and along its system. Students are requested to take up studies along the lines in which they are engaged, but this is not compulsory. An employee is privileged to obtain any text book he desires and enroll as a student in any of the branches taught by the bureau.

This is a new field for industrial educational work. The plan commends itself to other railroad companies.

America and the Foreign Patent

The annual report of the Commissioner of Patents contains much information, including statistics, having an important bearing upon the problem of the compulsory working of patents. Of the total of 35,778 patents issued, 3719 were to citizens of foreign countries. The classification according to nations includes Germany, 1083; England, 894; Scotland, 67; Ireland, 12; Canada, 534; France, 315; Austria-Hungary, 139; Sweden, 124; Switzerland, 77; Victoria, 66; Belgium, 61; Italy, 47; Russia, 47; Norway, 35; Mexico, 31; New Zealand, 30; Denmark, 28; Transvaal, 28; New South Wales, 23; Netherlands, 18; Cuba, 9; Spain, 9; Argentina, 8, and Japan, 8, and thence through a long list of countries which make a still smaller showing.

In most of these countries the compulsory working of all patents is required. The chief exception in regard to the patents of Americans is Germany, with which country a special treaty exists. The commissioner states that treaties of like import with other countries are now pending. Should this interchange be established as a general practice, especially covering those nations which are most important to industrial and commercial America, an essential element of the need of a compulsory working clause in our own patent laws would be eliminated. However, Germany is fretting over the existing arrangement, and legislation to remove a discrimination in favor of American inventors is proposed. Probably much depends, in the negotiations with other countries and the permanency of their results, upon the success of what may be termed this experimental treaty with Germany.

Including Germany, some 10 per cent. of patents issued by the United States are to citizens of other countries. Excluding Germany, some 7 per cent. of American patents are issued to citizens of other countries which require the working of patents issued by them to Americans. The American manufacturer cannot use foreign inventions because of United States patents. The foreign industry can procure the cancellation of any patent issued by his country, if it is not worked commercially. The outcome is the establishment of many American branch plants abroad.

It must also be taken into important account that a very much higher percentage of the foreign inventions patented at Washington are really useful in the industrial arts than with domestic patents, for an invention must usually be assured of some practical value before the inventor or the assignor will go to the cost of covering the device or process in the other industrial countries.

The need of some change covering the entire situation is undoubted. If by treaty the American inventor shall secure the same protection in foreign countries as is accorded to the citizens of those countries by the United States, probably the end will be served very well. But difficulties exist as to the permanency of such a practice, if, as under the German treaty, the American has greater privileges in the foreign country than those of the citizen, who is not exempt from the compulsory working principle. The agitation should speedily lead to a satisfactory solution of the question.

A Novelty in Apprentice Systems

A machine shop employing some 150 men is establishing an apprentice system on an essentially different principle from the common practice. The boy is given direct financial benefits from a premium system; he receives instruction from an expert whose time is devoted to increasing the general efficiency of the works; and, which is very exceptional, the apprentice's term of service is based not on a series or periods of proscribed lengths, but on his progress in acquiring the skill and knowledge of his trade. The course is divided into the usual number of terms, each having its wage scale, gradually ascending. But the marking points of advance from one wage to another are standards of labor. When an apprentice arrives at a predetermined degree of efficiency, he passes to the next period of the course. What may require four years for one boy to accomplish, another may do in two. It depends upon himself entirely; upon his adaptability, his native mechanical intellect, his application and his ambition.

The instructor's duties extend beyond the apprentice class. He is the efficiency man of the shop system. His duty is to study the processes of manufacture of every part and piece going through the plant; the methods of handling work; to search for wasted effort and those traditionary customs among the men which in some plants establish the rate of production. Comparisons of methods are made; the speeds of various workmen on the same class of work are put side by side and improvement made on the best previous practice. The important factor of periods of relaxation, scientifically determined, is given attention, that undue physical and mental fatigue may not result from increasing tension. The atmosphere in which the boy is employed is one of constant striving after the most economical and effective methods of manufacture. The instructor gives him the benefits of the results of these studies; in fact, the apprentice participates directly in them. In many shops the apprentice receives little direct attention. His instructor is a foreman, a busy man whose time is divided among a group of workmen and apprentices and many other details of routine and emergency. The boy is expected to learn largely from observation, frequently of the work of men whose mechanical ability is limited. In the shop in question, the management after a study extending over several months found that the foreman of the most important department of the shop—the department, in fact, in which the apprentices receive the most valuable part of their training—could be expected to give to the student hardly more than five minutes of the average day. Such instruction was inadequate. The obvious deduction was that the boys had merely been learning from what they saw about them and from questions asked of older workmen. Therefore they were able to

do justice neither to themselves nor to their employer.

The premium system as laid down has originality. The worker gets all of the saving over the fixed time. If 50 hours are allotted for a job, and the apprentice or workman does it in 40 hours, he has earned for himself 10 hours' pay at his regular wage rate. He does not divide the saving over the charted schedule. The boy earning 9 cents an hour receives 90 cents extra if he saves 10 hours. But the original 50 hours is not the previous rate for the job. It is an arbitrary unit based on what reasonably might be expected, as a result of the investigations of the efficiency man. In the case cited, the former average time for the job may have been 60 hours. The arbitrary time once set, it remains. What is saved beyond that time goes to the employee. The division of the saving is made in advance, the employer taking his share first, but not begrudging whatever his workmen may get afterward. He has the additional benefit which comes with the increase in machine efficiency and the other resultant economies in overhead expenses. The workmen and apprentices receive the continued assistance of the expert, after the original calculations have been made, and experience has shown that efficiency increases with the passage of time.

Upon his successes in this inspiring atmosphere depends the progress of the apprentice. A first period, in most shops of six months, may be covered in two months. Previous shop experience of the boy may make this possible. So it goes throughout the course. Exact limits of service are destroyed. The reward of ability and intelligent energy is the earlier attainment of increased pay and the earlier final advancement to the dignity of journeyman, and also the extra dollars from the premium system. The principle has its strong points. Probably the new inducement will make it easier to get desirable boys. Classroom studies are not included, nor is shop time devoted to the drafting room. But the instructor's influence will doubtless send many of the students to evening school. The system is one of automatic reward for ambition and aptitude, a reward applied without prejudice or favor.

A Machinery Exhibit That Paid

Whether machinery exhibits at expositions held in the past in this and other countries have brought adequate financial returns for the investment is a much mooted question among manufacturers, but at least one international show held last summer gave good returns to a group of English exhibitors. This was the Buenos Ayres Centenary Exposition at which a representative display of metal working machinery and agricultural implements was shown by British manufacturers. According to Commissioner-General Akers, who had charge of the British section, the exhibitors in that division received $200 in orders for every dollar they spent in its organization. The total cost of fitting up and maintaining the section was $70,000, and already $12,500,000 worth of orders have gone from Argentina to the British firms participating in the show. The chief exhibitors in the section were the makers of metal working machinery and agricultural implements, and it is stated that some of the manufacturers in this line booked orders far exceeding the average of $200 for every dollar spent.

American agricultural machinery and dairy equipment were well represented at the Buenos Ayres Exposition, and the United States Steel Products Company had a representative display. Efforts were made to get our makers of metal working machinery interested in the show, but with poor success. The United States Steel Products Company worked along these lines, and some of its officials spent valuable time in efforts to organize a representative American machinery exhibit, but the majority of those approached had the Jamestown fiasco fresh in their minds and refused to give the enterprise any consideration. It is on record that the few American manufacturers who did participate in the show were well rewarded.

What "Depreciation" Means

Wm. B. Jackson of the engineering firm of D. C. & Wm. B. Jackson, Boston, Mass., says that in considering the depreciation problem it is essential to understand clearly what the word "depreciation" actually represents. Every part of a properly constructed and well equipped property can be maintained in good operative condition by current repairs for a period of years, but the time comes with every building and unit of equipment when it, like a suit of clothes, can no longer be kept serviceable by repairs or current maintenance, and when it must consequently be replaced substantially in its entirety.

The length of useful life of a unit is determined by one or both of two factors: First, the inherent quality of most physical property to deteriorate, on account of the effects of use and of the elements, to a point where it cannot be longer economically maintained in satisfactory operative condition by ordinary repairs—that is, a unit ultimately reaches a point of "decrepitude" when it is either impossible to keep it in satisfactory operative condition by current repairs or the cost for such repairs becomes so great that it is more economical to replace the old unit by a new one. Second, the effects of changes whereby the character of the service required is so changed, or the efficiency of apparatus for providing corresponding service is so improved, that the plant, though still physically capable of doing the work for which it was designed, is no longer able to economically provide the service required, and it is therefore obsolete. This second factor is well designated "obsolescence."

A third division, called "inadequacy," is sometimes considered in estimating depreciation. This is intended to cover the effect upon the useful life of apparatus or plant of expansion in business, whereby otherwise serviceable apparatus is outgrown and must be replaced by larger apparatus. Mr. Jackson does not consider such a division necessary, for any effect caused by inadequacy which can be estimated may properly be considered under "obsolescence."

Carting a 60-Ton Girder.—Six of the large steel girders, fabricated by the Pennsylvania Steel Company, to support the columns for the upper portion of the 40-story Municipal Building in New York City, were moved from a pier on the Hudson River to the building at Center and Chambers streets, on Sunday last. The building will extend on both sides of Chambers street and these girders will span that thoroughfare. One of the girders weighed 60 tons and the others about 30 tons each. The depth of the largest girder is 10 ft. ½ in. from back to back of the angles. In transporting this girder a 20-ton truck drawn by 34 horses was used. Each wheel of the truck was made of steel, was 14 in. wide and weighed 3000 lb. The street pavement was only slightly damaged but numerous manhole covers were broken by the weight of the girders and in some cases the same cover had to be replaced after each trip.

The Hubbard Steel Foundry Company, East Chicago, Ind., has increased its capital stock from $300,000 to $400,000.

New Publications.

The Aeroplane. By T. O'B. Hubbard, J. H. Ledeboer and C. C. Turner. Size 5 x 7½ in.; 128 pages, 4 plates and 35 diagrams. Bound in cloth. Price $1.00 net. Published by Longmans, Green & Co., Fourth avenue and Thirtieth street, New York City.

The purpose of the present volume is to provide a complete textbook of the elements of dynamic flight and to give in simple language the laws governing aviation. This is a new branch of engineering science as well as a new and important industry and bearing in mind the requirements of education along the former line, the authors have endeavored to produce a book suitable for use in schools and colleges, as well as for the student and general reader.

The book is divided into nine chapters, a bibliography, a glossary and a number of useful tables. Except for the opening chapter, the divisions are purely arbitrary. The factors involved in a consideration of the science and its practice are so interdependent that a certain amount of repetition is unavoidable and is really essential for the sake of clearness. In chapter I. the properties of the air are discussed and in the next two the resistance and the flow of the air are taken up. Chapter IV. deals with theory of the aeroplane, while the next two chapters are given over to stability and steering and propulsion. In the next chapter the various points entering into the design of aeroplane are considered and the various types described. Instruction in the art of navigating the air is given in chapter VIII. and the final chapter deals with the various forms of motors employed for propulsion. The bibliography of aeroplaning, a glossary, a number of tables of conversion factors, velocity and pressure of wind and a barometric hight table complete the book.

Smoley's Parallel Tables of Logarithms and Squares.—By Constantine Smoley, C. E. Fifth edition revised and enlarged. Size 4½ x 7 in.; 174 pages. Bound in flexible leather. Price $3.50. Published by the Engineering News Publishing Company, 220 Broadway, New York City.

In this new edition, the second part containing the logarithmic-trigonometric tables, has been augmented by extending the table of natural functions and the including of numerous other tables. The table of natural functions gives the sine, cosine, tangent, cotangent, secant and cosecant for every minute in the quadrant and replaces the older table in which the functions were given by intervals of 10 minutes. The other additions comprise tables of squares, cubes, square and cube roots and reciprocals of all numbers from 1 to 1000 and tables of areas and circumferences of circles with diameters of from 1 to 1000. These additions enable a large field of theoretical and practical work to be covered, but at the same time the increase in the number of pages, 44, is not so great as to detract from the value of the book as a handy pocket manual for engineers, architects and students.

Drop Forging, Die Sinking and the Machine Forming of Steel.—By Joseph V. Woodworth. Size 6 x 9 in.; 320 pages, 304 illustrations. Bound in cloth. Price $2.50. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City.

This book is a practical treatise on the hot and cold machine forming of steel and iron into finished shapes, together with the tools, dies and machinery involved in the manufacture of duplicate forgings and interchangeable hot and cold pressed parts from bar and sheet metal. The author has endeavored to treat the subject comprehensively and thoroughly, and with that end in view technical and ambiguous terms have been replaced by practical and familiar shop words, and all the illustrations and descriptions are plain and easy to understand.

The volume is divided into 11 chapters and the first deals with die sinking and drop forging practice and designs for the production of duplicate metal parts. A description of the use of embossing and drop forging dies and the design and the construction of drop forging and hardening plants follows. Chapter V. is devoted to the subject of drop hammers and treats of their development and weight, the foundations required by them and the dies which they use. The treatment of steel and iron for working in machine forging is discussed in the next chapter, and chapter VII. describes the press and the hammer forming of heavy hot and cold bar and sheet stock in dies and the assembling and manufacture of finished products. The next two chapters contain descriptions of the various types of machines and processes supplemented by examples of modern practice in the manufacture of machine forgings. Hydraulic forging methods, autogenous welding and general shop practice are considered in chapter X., while the final chapter is given over to the making of various types of cutting tools, the use of drop presses for making flatwear and the hardening of drop dies.

The Engineering Directory for 1911. Size 4 x 6½ in.; 1378 pages. Bound in boards. Price $5. Published by the Crawford Publishing Company, 209 North Jefferson street, Chicago, Ill.

The latest edition is very much enlarged over the previous ones, which were largely devoted to heating and plumbing goods. In addition to bringing the matter contained in former editions up to date, there is a 150-page directory of jobbers and dealers in mill, steam, mine, railroad and heating supplies and tools and machinery as well as directories of electric light and power plants, gas companies, water works, architects and purchasing and manufacturers' agents. An exhaustive classified list of products with the maker's name completes the book.

Analysis Books of Lake Superior Ores

M. A. Hanna & Co., Cleveland, Ohio, have issued their analysis book of the Lake Superior ores they will ship during 1911. Cargo analysis for 1910 and guarantees for 1911 are given. Of the 40 ores listed, 12 are Bessemer, 25 non-Bessemer, 1 manganiferous and 2 silicious. Twenty-one are from the Mesaba range and 19 are distributed between the Gogebic, Marquette and Menominee ranges. Among the ores listed are those from the Newport mine in the Gogebic range. The output of this underground mine has increased rapidly in the past two years, the shipments in 1910 having reached 1,189,000 tons. Among other ores listed are those of the Republic mine in the Marquette range, one of the oldest mines in the Lake Superior district. From this mine 150,732 tons of ore were taken in 1910 and its total output has been 6,343,000 tons.

The Tod-Stambaugh Company, Cleveland, announces the analysis of its Mesaba range ore, which will be offered in the season of 1911. These comprise Biwabik ore and Schilling ore from the Biwabik mine, the former a Bessemer and the latter a non-Bessemer; the Morton ore, a Bessemer, and the Crawford ore, a non-Bessemer, from the Morton mine; the Ruddy ore, a Bessemer, from the Ruddy mine, and the Helmer No. 2 ore, a non-Bessemer from the Helmer mine. The Ruddy ore runs 62.03 per cent. in iron, 0.038 per cent. in phosphorus, and 5.75 per cent. in silica, with 10 per cent. moisture. The iron natural is thus 55.827 per cent.

Pickands, Mather & Co., Cleveland, present in their new annual pamphlet exhaustive analyses of their Lake Superior iron ores based in most cases on the shipments of 1910, while in a few instances expected analyses for 1911 are given. There are 10 old range Bessemer ores, 13 Mesaba Bessemers, 13 old range non-Bessemer ores, 12 Mesaba range non-Bessemers and 3 silicious ores. The ore on the list which is highest in iron is Section 30 Bessemer, which runs 63.10, dried at 212 deg., and 59.57 natural, the phosphorus being 0.045 and 0.0425 per cent., respectively.

The monthly meeting of the Pittsburgh Foundrymen's Association was held in Engineers' Hall, Oliver Building, Pittsburgh, on the evening of March 6. The meeting was addressed by B. D. Fuller, superintendent of the foundries of the Westinghouse Electric & Mfg. Company, Cleveland, Ohio, on "Conservation of Foundry Materials."

Pig Iron Production

A Marked Increase in February

Capacity Active March 1 Represents 24,450,000 Tons a Year

There was a steady increase in pig iron production throughout February. The total of coke and anthracite iron for the 28 days was 1,794,509 tons, or 64,090 tons a day, against 56,752 tons a day in January, a gain of 13 per cent. There was a gain of 16 active furnaces in the month, all due to the resumption of steel works furnaces, the active merchant furnaces showing a net loss of one, though the daily output of merchant iron increased over that of January, due to somewhat faster driving at a number of plants. The daily capacity of the 222 furnaces in blast March 1 was 66,562 tons against 59,568 tons a day for 206 furnaces February 1. Production to-day, including charcoal iron (which is about 350,000 tons a year) is at the rate of 24,450,000 tons a year, against a rate of 22,000,000 tons a year February 1, and 19,700,000 tons at the low point to which it had fallen at the opening of the year. The high mark reached in early 1910 was a rate of 31,600,000 tons a year in February. Thus about 40 per cent. of the falling off between February, 1910, and the end of last year, has now been recovered.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with February, 1910, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel Works.	Merchant.	Total.
February, 1910	57,876	27,740	85,616
March	56,113	28,346	84,459
April	55,663	27,129	82,792
May	52,235	24,867	77,102
June	51,637	23,879	75,516
July	47,183	22,122	69,305
August	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911	36,401	20,351	56,752
February	42,349	21,741	64,090

February Output by Districts

The table below gives the production of all coke and anthracite furnaces in February and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.

	October. (31 days)	November. (30 days)	December. (31 days)	January. (31 days)	February. (28 days)
New York	147,894	142,610	142,674	136,519	131,238
New Jersey	19,115	18,284	15,437	12,627	6,003
Lehigh Valley	69,327	62,161	68,531	68,324	56,367
Schuylkill Val.	61,673	54,642	51,466	60,592	57,321
Lower Susquehanna and Lebanon Val.	54,072	50,370	51,888	43,942	42,729
Pittsburgh dis.	507,508	445,083	397,379	409,698	424,517
Shenango Val.	112,026	82,904	82,706	82,922	86,908
West. Penn.	126,098	87,568	81,957	94,118	96,616
Md., Va. and Kentucky	67,926	58,772	59,945	56,424	57,759
Wheeling dis.	76,581	84,390	74,225	77,715	95,571
Mahoning Val.	202,667	180,717	162,349	174,318	201,624
Central and North. Ohio.	117,902	108,599	112,662	127,579	144,808
Hocking Valley, Hanging Rock and S.W.Ohio.	24,029	25,008	29,959	33,253	32,396
Mich.,Minn.,Mo., Wis.,Col.,Wash.	72,825	78,927	68,313	60,941	61,406
Chicago dis.	246,504	239,469	197,340	165,826	155,498
Alabama	160,077	165,512	154,025	128,188	118,594
Tenn., Georgia and Texas	26,897	24,764	26,961	26,340	25,153
Totals	2,093,121	1,909,780	1,777,817	1,759,326	1,794,509

Among furnaces blown in in February were one Lackawanna and New York State Steel Company in New York, Delaware River in Eastern Pennsylvania, one Duquesne, two Edgar Thompson, one Isabella and Clinton in the Pittsburgh district, Hall in the Shenango Valley, one Cambria in Western Pennsylvania, one Maryland at Sparrows Point, two Mingo, Benwood and Riverside in the Wheeling district, one Newburg and one Lorain in Northern Ohio, and two Joliet and two South Chicago in Illinois.

The furnaces blown out last month were one Wharton in New Jersey, one Eliza in the Pittsburgh district, Colonial in Western Pennsylvania, one Ohio in the Mahoning Valley and one Iroquois in Illinois.

Capacity in Blast March 1 and February 1

The following table shows the daily capacity of furnaces in blast March 1 and February 1. These figures are based largely on the performance of the furnaces in the past two months:

Coke and Anthracite Furnaces in Blast and Capacity.—Gross Tons.

Location of furnaces.	Total number of stacks.	March 1, Number in blast.	March 1, Capacity per day.	February 1, Number in blast.	February 1, Capacity per day.
New York:					
Buffalo	17	14	4,665	12	3,931
Other New York	7	3	529	3	558
New Jersey	7	1	156	2	410
Spiegel	2	..	....	..	....
Pennsylvania:					
Lehigh Valley	23	11	1,928	11	2,110
Spiegel	3	1	85	1	95
Schuylkill Valley	16	8	2,178	7	1,965
Low. Susquehanna	7	4	716	4	705
Lebanon Valley	10	5	810	5	712
Pittsburgh dis.	50	38	15,620	35	14,215
Spiegel	3	2	373	1	130
Shenango Valley	20	10	3,250	9	2,997
West. Penn.	27	11	3,375	11	2,990
Maryland	4	3	820	2	575
Wheeling dis.	14	12	4,350	8	2,850
Ohio:					
Mahoning Valley	23	17	6,425	18	6,240
Central and North.	22	14	5,232	12	4,244
Hocking Val., Hanging Rock and S. W. Ohio	15	8	1,157	8	1,120
Illinois and Indiana	34	16	6,275	13	5,208
Michigan, Wisconsin and Minnesota	10	5	1,093	5	1,058
Colorado, Missouri and Washington	7	4	1,104	4	1,185
The South:					
Virginia	23	8	937	8	906
Kentucky	5	2	344	2	340
Alabama	46	17	4,235	17	4,134
Tenn. and Georgia	20	8	905	8	890
Totals	415	222	66,562	206	59,568

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.— 1909.	1910.	1911.	Spiegeleisen and ferromanganese. 1910.	1911.
January	1,117,823	1,773,201	1,128,448	19,538	8,360
February	1,073,363	1,620,539	1,185,782	21,396	12,821
March	1,140,553	1,739,212	.....	25,591	....
April	1,093,092	1,669,898	.....	22,304	....
May	1,256,448	1,619,283	.....	26,529	....
June	1,365,527	1,549,112	.....	27,680	....
July	1,508,762	1,462,689	.....	22,924	....
August	1,591,991	1,442,572	.....	25,756	....
September	1,660,839	1,410,221	.....	15,151	....
October	1,769,094	1,419,624	.....	8,500	....
November	1,689,994	1,242,804	.....	9,032	....
December	1,768,799	1,113,174	.....	12,178	....

Graphic Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January	71,149	33,718	57,975	84,148	56,752
February	73,038	37,163	60,976	85,616	64,090
March	71,821	39,619	59,232	84,459	.....
April	73,885	38,289	57,902	82,792	.....
May	74,048	37,603	60,753	77,102	.....
June	74,486	36,444	64,656	75,516	.....
July	72,763	39,287	67,793	69,305	.....
August	72,594	43,851	72,546	67,963	.....
September	72,783	47,300	79,507	68,476	.....
October	75,386	50,554	83,856	67,520	.....
November	60,937	52,595	84,917	63,659	.....
December	39,815	56,158	85,022	57,349	.....

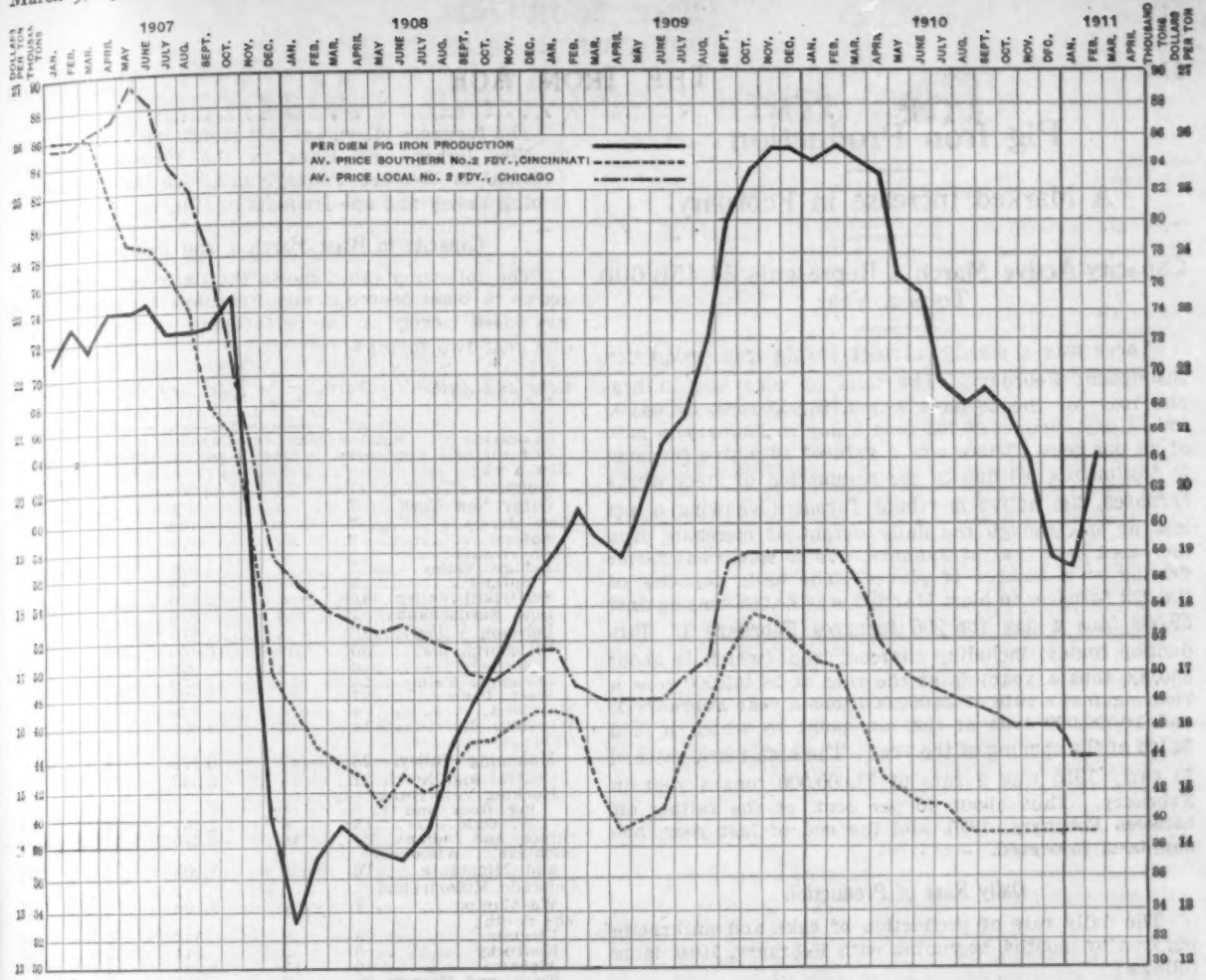

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to March 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron Delivered at Chicago.

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou. No. 2 Cin.	Loc. No. 2 Chi.	Sou. No. 2 Cin.	Loc. No. 2 Chi.	Sou. No. 2 Cin.	Loc. No. 2 Chi.	Sou. No. 2 Cin.	Loc. No. 2 Chi.
Jan.	26.00	25.85	16.15	18.45	16.25	17.35	17.25	19.00
Feb.	26.00	25.85	15.75	18.16	16.13	16.75	17.06	19.00
March	26.00	26.10	15.50	17.85	15.05	16.50	16.30	18.30
April	25.06	26.35	15.20	17.73	14.25	16.50	15.37	17.50
May	24.25	26.85	14.75	17.63	14.50	16.50	15.00	17.06
June	24.10	26.60	15.25	17.73	14.70	16.50	14.85	16.75
July	23.85	25.55	15.00	17.55	15.75	17.00	14.75	16.56
Aug.	23.00	24.85	15.25	17.35	16.38	17.13	14.31	16.50
Sept.	21.50	24.10	15.65	17.05	17.35	18.70	14.25	16.40
Oct.	20.95	22.45	15.75	16.85	17.88	19.00	14.25	16.06
Nov.	19.50	20.66	16.00	17.10	17.75	19.00	14.25	16.00
Dec.	17.00	18.80	16.25	17.35	17.45	19.00	14.25	16.00

Jan., 1911, 14.25 15.50; Feb., 1911, 14.25 15.50

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January	2,205,607	1,045,250	1,797,560	2,608,605
February	2,045,068	1,077,740	1,707,340	2,397,254
March	2,226,457	1,228,204	1,832,194	2,617,949
April	2,216,558	1,149,602	1,738,877	2,483,763
May	2,295,505	1,165,685	1,883,330	2,390,180
June	2,234,575	1,092,131	1,930,866	2,265,478
July	2,255,660	1,218,129	2,103,431	2,148,442
August	2,250,410	1,359,831	2,248,930	2,106,847
September	2,183,487	1,418,998	2,385,208	2,056,275
October	2,336,972	1,567,198	2,599,541	2,093,121
November	1,828,125	1,577,854	2,547,508	1,909,780
December	1,234,279	1,740,912	2,635,680	1,777,817

January, 1911, 1,759,326; February, 1911, 1,794,509.

Employment Bureau of Pittsburgh Manufacturers' Association

For some years the Manufacturers' Association, with offices in the Lewis Building, Pittsburgh, has conducted an employment bureau very successfully. It is in charge of D. H. Crieder, secretary of the association. In reply to questions recently asked as to the operations of this bureau, the association has made a statement from which the following is taken:

"The employment bureau aims to establish the principle of fair dealing between employee and employer, and to protect both in the exercise of their free rights as individuals, given by the constitution of the United States. The main purpose of the bureau is to make it easy for the employer to find men who want work, and for the men, when they want work, to find an employer—a plain, simple proposition, making it possible for men out of work to learn at one place which employers are in need of men, and, by leaving their applications, making it possible for employers to learn at the same place what men want work.

"One of the principal objects of the bureau is to show both employer and employee that their interest are identical, and that the greatest good can be secured for both by their united efforts. The bureau keeps no black list."

The Ferro Machine & Foundry Company's Improvements

The Ferro Machine & Foundry Company, Cleveland, Ohio, has just completed at its factory a large office building in which are combined the two divisions of its office force, one of which had previously been in the downtown section of the city. The rapid growth of the company's business compelled it to increase its office facilities. This building is two stories and has a floor space of 15,000 sq. ft. A careful study of some of the largest offices in the country was made and the Ferro office was laid out so as to facilitate in every way the rapid handling of the business. The most modern improvements and equipment are installed throughout. Other important additions have been made to the company's plant within the last 12 months. Among these was a large extension of the foundry and a new coreroom, the latter being generally conceded to be the finest of its kind. The Ferro factory now covers an area which makes it one of the largest in the world devoted to the casting of automobile parts. All of the machinery, a large percentage of it being of special design, is electrically driven. In addition to making automobile parts the company builds marine engines.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Mar. 8, 1911.	Mar. 1, 1911.	Feb. 8, 1911.	Mar. 9, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.50	$15.50	$15.50	$18.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	16.50
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	13.25
Foundry No. 2, local, Chicago	15 50	15.50	15.50	18.50
Basic, delivered, eastern Pa.	**15.25**	15.00	14.50	18.50
Basic, Valley furnace	13.75	13.75	13.75	16.00
Bessemer, Pittsburgh	15.90	15.90	15.90	18.65
Gray forge, Pittsburgh	14.40	14.40	14.15	16.15
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	29.00	29.00	29.00	33.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	15.50	15.50	14.50	19.00
Iron rails, Philadelphia	18.50	18.50	17.00	20.00
Car wheels, Chicago	13.25	13.25	13.00	17.00
Car wheels, Philadelphia	14.00	14.00	13.00	16.75
Heavy steel scrap, Pittsburgh	14.75	14.75	13.75	16.50
Heavy steel scrap, Chicago	12.00	12.00	11.50	15.00
Heavy steel scrap, Philadelphia	*14.00*	14.50	13.00	16.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.37½	1.37½	1.29	1.57½
Common iron bars, Chicago	1.27½	1.27½	1.30	1.55
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.65
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60
SHEETS, NAILS AND WIRE, Per Pound	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	**1.80**	1.75	1.75	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.85
Barb wire, galv., Pittsburgh*	**2.10**	2.05	2.05	2.15
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	*12.62½*	12.75	12.75	13.75
Electrolytic copper, New York	*12.25*	12.37½	12.37½	13.50
Spelter, New York	*5.65*	5.70	5.50	5.73
Spelter, St. Louis	*5.50*	5.55	5.30	5.58
Lead, New York	4.40	4.40	4.45	4.55
Lead, St. Louis	4.25	4.25	4.30	4.40
Tin, New York	*41.75*	42.25	40.12½	32.45
Antimony, Hallett, New York	9.25	9.25	7.75	8.25
Tin plate, 100-lb. box New York	$3.94	$3.94	$3.94	$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ⅓-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized sheets, No. 28, $2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt Weld.				
⅛, ¼, ⅜ in.	72	58	68	54
½ in.	75	63	71	59
¾ to 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weights.				
⅛, ¼, ⅜ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
¼ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

THE IRON AND METAL MARKETS

Plugged and Reamed.

1 to 1½, 2 to 3 in.	Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in.	Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—discounts on lap welded steel and charcoal iron boiler tubes to jobbers in charcoal are as follows:

	Steel.	Iron.
1 to 1¼ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $29.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, March 8, 1911.—(*By Telegraph.*)

Pig Iron.—Following the fairly heavy sales of Bessemer and basic iron, made recently for delivery running into the third quarter of this year on the basis of about $13.75 for basic and $15 for Bessemer, at Valley furnace, the market has quieted down considerably and new inquiry is light. In fact, it is understood that some consumers who held options on both Bessemer and basic iron have allowed these to lapse, and have decided not to buy on account of the somewhat uncertain business outlook. Stocks of pig iron held by the furnaces are still very heavy and would seem to preclude any further advance in prices until there is a material improvement in demand. The consumption of pig iron is not yet satisfactory, and shipments are being held up to some extent. We quote Bessemer pig iron, $15; malleable Bessemer, $13.75; basic, $13.75 to $14; No. 2 foundry, $13.75 to $14, and gray forge, $13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Consumers of billets and sheet and tin bars are urging the mills to make prompt shipment. The actual consumption of steel at present is heavier than for some months. Consumers are pretty well covered to April 30, or beyond, and there is very little new business. Producers of steel are working in close harmony with each other and regular prices are being very firmly held. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at $23, base, and sheet and tin bars in 30-ft. lengths, $24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at $24 and forging billets at $28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(*By Mail.*)

Consumers have returned to the policy of placing orders conservatively, and apprehension is expressed as to the future. While it is true that actual orders entered and sent to the mills in February showed a material increase over January, the February rate has not been maintained so far this month, but nearly all lines have shown a falling off. While there has been some buying of Bessemer and basic pig iron recently, the market has quieted down again and is dull. Consumers of billets and sheet bars are specifying liberally against their contracts, and the movement of steel from the mills to consumers is heavier than for some time. The advance of $1 a ton in wire products, effective from March 6, was not unexpected by the trade, but large consumers were pretty well covered, and buying at the higher prices will probably be light for some time. Prices on scrap are about stationary, with new demand quiet. Coke is showing a stronger tone and standard makes of furnace coke have sold at $1.75 at oven for delivery over this year. Some prominent makers of coke will not meet this price but are asking $1.90 to $2.

Ferromanganese.—The very low prices now being made are stirring up some business. Two sales of foreign 80 per cent. have been made, part for delivery prior to July at $37.50, and the rest for the remainder of this year at $37.75, Baltimore. We quote 80 per cent. foreign for prompt shipment at $37.50, and for delivery over the last half of the year at $37.75 to $38, Baltimore. The rate for delivery in Pittsburgh district is $1.95 a ton.

Ferrosilicon.—A sale of 300 tons of 50 per cent. has been made for forward delivery to a local consumer at very close to $53, Pittsburgh. Some further inquiry is in the market, but prices on that grade are weak. We quote 50 per cent. at $53.50 to $54, f.o.b. Pittsburgh, for delivery up to July; 10 per cent. blast furnace silicon, $23; 11 per cent., $24, and 12 per cent., $25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—No new inquiry has come out. Best grades, made from all pig iron, are still quoted at about $30, Pittsburgh. The Wilkes Rolling Mill Company, Sharon, Pa., has started up its muck bar mill, which has been idle for some time.

Skelp.—A sale of about 1000 tons of wide sheared iron plates is reported at a price equal to about 1.75c., delivered at buyer's mill in the Pittsburgh district. New inquiry is fairly active and prices are firm. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—Wire rods, being a semi-finished product, are not strictly governed by advances in prices of wire products; however, one leading maker of rods is now quoting $30, while another producer is still quoting $29. There is not much new inquiry, leading consumers having covered some time ago when prices were lower. We quote Bessemer, open hearth and chain rods at $29 to $30, Pittsburgh.

Steel Rails.—The situation in standard sections is very dull, but the Carnegie Steel Company is receiving some fair sized orders for export through the United States Steel Products Company. The new demand for light rails is more active, especially from the lumber interests, and in the past week the Carnegie Company received specifications and new orders for about 5000 tons. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Wabash-Pittsburgh Terminal Railroad has at last given a contract to the Pressed Steel Car Company for 500 50-ton steel hopper cars and a similar order to the Standard Steel Car Company. The New York Central has placed orders with the Pressed Steel Car Company and Standard Steel Car Company, each for 25 all-steel postal cars. The latter has taken an order for the Boston Elevated for 30 all-steel coaches, and the Western Maryland Railroad has an inquiry out for 500 all-steel hopper cars. The general demand for plates is only fair, and none of the mills has orders enough to run to more than 60 to 75 per cent. of capacity. Prices are firm, and we quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—Very few contracts were placed in the past week. New inquiry is light, and only for small jobs. The McClintic-Marshall Construction Company has taken 400 tons for steel buildings for the Rome Brass Company, Rome, N. Y. Complaints are made about the very low prices at which work is going, and it is claimed that in some cases it is being taken at less than cost. We quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—While the new demand is light and is not expected to open up for several months yet, specifications against contracts are coming in freely. Shipments of tin mill products by the American Sheet & Tin Plate Company in February were the heaviest in any one month since March of last year; it is now operating to 88 per cent. of its tin mill capacity, which is practically normal. The market is firm, and we quote 100-lb. cokes at $3.70 per base box, f.o.b. Pittsburgh.

Sheets.—The demand is not as heavy at this time as had been anticipated. Betterment, especially in roofing sheets, is expected in the near future, as the outside building trade will soon take on activity. Regular prices on the different grades of sheets, printed on a previous page, are referred to as being well maintained. The Youngstown Sheet & Tube Company is operating this week all of its 14 hot sheet mills, the first time in some months.

Bars.—Specifications against contracts for steel bars are a little better, but new demand is dull. The implement makers and wagon builders have not yet shown a tendency to come in the market and contract for their supply of steel bars for 1911-1912. Prices on iron bars are referred to as being a little stronger, but all the mills are in need of new orders and specifications are not very satisfactory. We quote steel bars at 1.40c. and iron bars at 1.55c., f.o.b. Pittsburgh, Pa.

SONS.
Mechanical and Civil Engineers
PITTSBURGH, PA.

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Hoops and Bands.—A fair run of new orders is being placed and specifications against contracts in February are reported to have been slightly better than in January. We quote steel hoops at 1.50c. and bands at 1.40c., extras on the latter as per the present steel bar card.

Spikes.—No orders of moment have been placed in the past week, but one of the large Western roads is in the market for 5000 kegs for early delivery. Prices are reported as being firmly held as follows:

Railroad Spikes.

4½, 5 and 5½ x 9/16	$1.55
3, 3½, 4, 4½ and 5 x ½	Extra .10
3½, 4 and 4½ x 7/16	Extra .20
3, 3½, 4 and 4½ x ⅜	Extra .30
2½ x ⅜	Extra .40
2½, 3 and 3½ x 9/16	Extra .60
2 x 9/16	Extra .80

Boat Spikes.

¾ in. square, 12 to 24 in. long	Extra .15
⅝ in. square, 8 to 16 in. long	Extra .15
½ in. square, 6 to 16 in. long	Extra .15
7/16 in. square, 6 to 12 in. long	Extra .20
⅜ in. square, 4 to 12 in. long	Extra .30
9/16 in. square, 4 to 8 in. long	Extra .45
¼ in. square, 4 to 8 in. long	Extra .75
¼ in. square, 3 to 3½ in. long	Extra 1.00

⅜ and 9/16 shorter than 4 in., ¼ cent extra.

Spelter.—Stocks are said to be low, and while consumers are merely buying as their needs require, they are compelled to pay full prices. A sale of 100 tons for March delivery is reported at 5.50c., East St. Louis, equal to 5.62½c., Pittsburgh.

Merchant Steel.—New orders and specifications so far this month are keeping up the pace set last month, and it is believed that March will show a material gain in new orders and shipments over February. Prices are said to be very firm, and we quote, f.o.b. Pittsburgh: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—A fair amount of new business is being placed, made up mostly of small orders to meet current needs, and specifications against contracts are reported to be heavier than for some time. Regular prices of 1.90c. on rivets and 2c. on boiler rivets are fairly strong, but are sometimes shaded for desirable orders.

Wire Products.—Effective Monday, March 6, the wire makers announced an advance of $1 a ton, which was not unexpected by the trade. Large jobbers and distributers were pretty well covered at the $1.70 and $1.75 prices on wire nails, so that new orders at this advance will likely be light for some time. It is stated that specifications against contracts are coming in at a very satisfactory rate. We quote galvanized barb wire at $2.10; painted, $1.80; annealed fence wire, $1.55; galvanized, $1.90; wire nails, $1.80; and cut nails, $1.60 to $1.65, f.o.b. Pittsburgh, full freight to destination added.

Merchant Pipe.—The new demand for merchant pipe is showing gradual betterment; orders and specifications entered by the mills in February showed a slight gain over January. Inquiries are in the market for 20 miles of 8-in. and about five miles of 4-in. pipe. There are also several large gas and oil lines being figured on, but these may not develop for some time. Reports of an advance in prices of pipe to be made at an early date do not come from official sources, and there are no indications at this time that such action will be taken in the near future. Discounts on iron and steel pipe printed on a previous page are referred to as being fairly well maintained.

Boiler Tubes.—The new demand for both locomotive and merchant tubes is light and specifications against contracts are not coming in at a satisfactory rate. Prices on tubes are still pretty badly demoralized.

Coke.—A Valley furnace interest closed in the past week for about 10,000 tons of blast furnace coke for March shipment at a price said to be about $1.60 per net ton, at oven, and also for 10,000 tons a month commencing April and running through the year at about $1.75 or $1.80, at oven. The market is showing more signs of improvement than for some time. The output in the Upper and Lower Connellsville regions last week was 339,338 tons, an increase over the previous week of more than 17,000 tons. We have advanced prices on standard grades of furnace coke for prompt shipment, and now quote $1.55 to $1.60 per net ton, at oven; on contracts for delivery over the remainder of this year $1.75 to $1.80 is being quoted by some makers, while others that have their product pretty well sold up are asking $1.90 to $2. Best makes of 72-hour foundry coke are held at about $2.10 per net ton, at oven, to dealers, and from $2.25 to $2.50 to consumers.

Iron and Steel Scrap.—The scrap market has quieted down to some extent. While prices remain firm, the upward movement seems to have stopped for the time being. Consumers are fairly well covered and are inclined to stay out of the market until assured that prices will not decline. The recent scrap list sent out by the Pennsylvania Railroad shows the largest offerings by that road for some months. While the general asking price for heavy steel scrap is $14.75, delivered at nearby consuming points, it is stated that $14.50 has been done on some recent sales of heavy steel scrap for delivery at Sharon, Pa., and one or two other points. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$14.75 to $15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.75 to 14.00
Bundled sheet scrap, at point of shipment	11.00 to 11.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.25 to 13.50
Grate bars	11.25 to 11.50
Low phosphorus melting stock	17.25 to 17.50
Iron car axles	24.75 to 25.00
Steel car axles	20.50 to 20.75
Locomotive axles	24.25 to 24.75
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.75 to 14.00
Sheet bar crop ends	16.00 to 16.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.25 to 10.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, March 8, 1911.—(*By Telegraph.*)

The prevalent quietness of pig iron in this market is regarded as a return to normal conditions. Orders for structural material are being received in good volume as the building season advances. A raise of $1 per ton in the price of wire products went into effect March 6. Activity has been exceptional in this line for a number of weeks, and mills are crowded to their utmost capacity. The advance of $1 a ton on track spikes, which was reported last week to have been made March 1, will take effect April 1. This week's scrap market has been well in the hands of buyers. Prices have fallen off on several grades, and local scrap yards have somewhat replenished their stocks. Railroad offerings have been active and the entire scrap market, though somewhat reduced in price, is steadier.

Pig Iron.—The market is quieter, but prices are firm. Inquiries are fair for both Northern and Southern iron, but these are principally for the last half, and few sales are being made. The price of Southern iron remains at $11, Birmingham, for No. 2 foundry for the first half; $11.25 for third quarter, and $11.75 for fourth quarter, but $11.50 continues to be quoted for the entire last half. Among the inquiries pending is 3000 tons of basic from a local steel foundry. Sales aggregating 6000 tons of Northern iron have been made by one selling interest, this week at $16, f.o.b. furnaces, for deliveries extending through the last half. Stocks in foundry yards are sufficient in many cases for the first half, and both furnaces and foundries seem to be lying on their oars awaiting developments. The following quotations are for March shipment, Chicago delivery, with the exception of Northern irons, which are quoted f.o.b. furnace:

Lake Superior charcoal	$17.50 to $18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

(*By Mail.*)

Billets.—The demand for billets continues light, and a maximum price of $30.60, base, Chicago, is being maintained on open hearth forging billets by the leading interest. Open hearth rerolling billets are quoted at $25.60, base, Chicago.

Rails and Track Supplies.—Business continues in good volume for track material and contracts from small roads for approximately 7000 tons were received by the leading

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mill the past week. **Prices are firm.** We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.20½c., Chicago.

Structural Material.—Good conditions prevail in every branch of the trade. Fabricators are specifying freely and shipping instructions continue normal. The Rock Island Railroad is in the market for 1600 tons of structural shapes, and the Chicago, Milwaukee & St. Paul is also out with a small list. Contracts let last week include the following: Metropolitan theatre, Seattle, Wash., 320 tons, to A. Bolter's Sons; Marshall Field loft building, Chicago, 1281 tons, to Vierling Steel Works, Chicago; William A. Kernagham, wharf shed, New Orleans, 1622 tons, to Fort Pitt Bridge & Iron Company; Furst-Kerber Stone Company, stone mill, Bedford, Ind., 277 tons, to Bedford Construction Company, Bedford, Ind.; Chicago, Milwaukee & St. Paul Railroad, viaduct over small creek in Idaho, 390 tons, to Milwaukee Bridge Company, Milwaukee, Wis; temporary city hall, San Francisco, Cal., 570 tons, to Pacific Rolling Mill Company, San Francisco, Cal.; Jefferson Hotel, Peoria, Ill., 980 tons, to Noelke & Richards Iron Company, Indianapolis, Ind. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—Liberal specifications continue to keep mills very busy. A normal volume of these are from railroad and car builders and with the letting in the near future of several contracts for rolling stock now pending this tonnage is expected to increase. Haskell & Barker, Michigan City, Ind., were awarded a contract recently for 1000 cars. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—There is little change in the situation on this product. Mills are operating about two-thirds of their capacity. Prices are well maintained and without change. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The bar iron market is steadier than it has been for some weeks. Specifications on contracts for steel bars are about normal, but with the approach of spring better business is anticipated. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.27½c. to 1.32½c.; hard steel bars rolled from old rails, 1.30c. to 1.35c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Old Material.—Scrap prices are lower, and there is a decided tendency to move speculative scrap on a buyer's market. The gambling tendency of the past few weeks has caused many local yards to buy country scrap at premium prices. This material they are holding. The Rock Island list of last week has been sold and the price for No. 1 wrought was $12.50, f.o.b. cars, Rock Island tracks. The Great Northern list, approximating 10,000 tons, will be awarded to-morrow. The Soo Line is out with a list of about 800 tons, which will close March 8, and the Chicago, Milwaukee & St. Paul with a list totaling 2000 tons, which closes on the same date. The market is uncertain. Prices are for delivery to buyers' works, all freight and transfer charges paid, and are as follows per gross ton:

Old iron rails	$15.50 to $16.00
Old steel rails, rerolling	13.50 to 14.00
Old steel rails, less than 3 ft	12.75 to 13.25
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels	13.25 to 13.75
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars	$13.00 to $13.50
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.50 to 12.00
Iron car axles	19.25 to 19.75
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.25 to 11.75
Steel knuckles and couplers	11.50 to 12.00
Locomotive tires, smooth	17.50 to 18.00
Steel axle turnings	8.00 to 8.50
Machine shop turnings	7.00 to 7.50
Cast and mixed borings	6.00 to 6.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	12.25 to 12.75
Stove plate and light cast scrap	10.25 to 10.75
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.00 to 10.50
Pipes and flues	9.00 to 9.50

Wire Products.—The anticipated raise of $1 a ton in the price of wire products went into effect March 6. Specifications for the past week have been enormous, and if continued will crowd mills in excess of capacity. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.78c.; wire nails, 1.98c.; painted barb wire, 1.98c.; galvanized, 2.28c.; polished staples, 1.98c.; galvanized staples, 2.28c., all Chicago.

Cast Iron Pipe.—The approach of the working season has increased demand from small municipalities. Toledo, Ohio, has contracted with the leading interest for 1000 tons. Minneapolis, Minn., is in the market for about 3500 tons, and Kalamazoo, Mich., for 700 tons. Gas companies are purchasing freely. Prices continue firm, as follows, per net ton, Chicago: Water pipe, 4-in., $25.50; 6 to 12 in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., March 7, 1911.

Recent gains, both in new business taken and the rate of production, appear to be fully maintained, and the trade looks forward to increasing activity. The effect of the recent freight rate decisions has been small, and it is believed that further railroad orders will be released at an early date. In the pig iron markets there is a gradual upward movement in prices. Basic iron has sold at a higher level, and producers of foundry and forge iron have, in a number of instances, withdrawn recent low quotations. Inquiry for pig iron for forward delivery continues in good volume, with few producers ready to accept business. The demand for finished materials has been fully maintained, with plates and shapes a trifle more active. Billets, bars and sheets also show an increased movement. In all classes of rolled products prices are firmly maintained. Old materials are quieter, with heavy melting steel selling at prices slightly under last week's quotations. Coke is in better inquiry and prices are distinctly harder.

Iron Ore.—While negotiations are pending for both foreign and local ores, no sales are reported. No movement in Swedish ore has yet taken place, although sellers expect to dispose of several hundred thousand tons for this season's consumption. Importations at this port during the week aggregated 16,776 tons, valued at $45,453.

Pig Iron.—Recent transactions have been on a broader scale, and the aggregate of sales shows an increase. Consumers are inquiring freely for forward deliveries. While sales of steel making grades have been made for third quarter delivery, producers in this district are still holding back when it comes to taking contracts for foundry grades for shipment beyond the first half. Prices are decidedly firmer and in a number of instances slight advances have been obtained. The recent inside quotation, $15.50, delivered, for No. 2 X foundry, for shipment up to the end of the first half, has been freely done, although sales at $15.75 and $16 have been more numerous. At the lower quotation sales of lots running from 100 to 500, and in several instances 1000, tons are reported. At the higher level transactions are still largely confined to non-competitive business, the amounts involved ranging from carloads to a few hundred tons. In several instances producers of standard brands in this territory have withdrawn recent low price quotations and state that for the time they are out of the market. Transactions in low grade foundry iron have been more pronounced. While some little Northern iron has figured in this business, the principal sales have been in Southern iron, one lot of 12,000 and another of 3000 tons being reported at the $11, Birmingham, basis for No. 2 foundry, delivery extending in one instance over the next five months. Cast iron pipe makers are still in the market, and several moderate lots are being figured on. A decrease in the amount of Southern low grade iron available for early delivery is reported. Malleable iron makers are in the market for forward delivery, and one sale of 750 tons of coke malleable for second and third quarter at $17.10, delivered in this vicinity, is reported. A larger range of business in this district is reported by makers of Virginia foundry irons. From statistics available at the meeting of the Virginia Pig Iron Association, held in this city last week, it is noted that unfilled orders in February increased 20 per cent. over those for the previous month, while stocks on hand showed a slight decrease as compared with the statistics for January. Virginia producers are holding firmly at $13, furnace, for No. 2 X or No. 2 plain foundry, for delivery in the next three months, although the leading interest quotes $13.50, furnace, for strictly second quarter shipment, while one interest will, it is stated, shade $13, furnace, 25c. a ton on No. 2 plain. Sales cover a wider range as to size, and at least one of 1000 tons for March, April and May shipment is reported. Rolling mills have been quietly covering requirements in forge iron; sales during the past two weeks, it has developed, will aggregate close to 10,000 tons, mostly for delivery during the next

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three to five months, at prices above recent quotations. The minimum for this grade is now $14, furnace, equal to $14.50 to $15, delivered in this vicinity, dependent on point of destination. A further movement in basic iron is noted; purchases have been largely on the part of one Eastern plate mill, which has bought from 12,000 to 15,000 tons, at $15.25, delivered, for shipment extending over various periods, which may be summed up as practically second and third quarter. One purchase of about 3000 tons for early delivery was also made at something over $15, delivered. The latter quotation has now practically disappeared and the principal sellers contend that they have all the business they want at $15.25, and are now holding firmly at $15.50, delivered. Negotiations are pending for further supplies, but business moves slowly, as prices gradually advance. Small sales of low phosphorus iron ore are reported, and prices of this grade also show a slight upward movement. The following range of prices is named for standard brands, delivered in buyers' yards in this district, delivery for the greater part being confined to prompt and second quarter:

Eastern Pennsylvania, No. 2 X foundry	$15.50 to $16.00
Eastern Pennsylvania, No. 2 plain	15.25 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.50 to 15.00
Basic	15.25 to 15.50
Standard low phosphorus	21.25 to 21.75

Ferromanganese.—No fresh demand is reported from consumers in this district, and the market is nominally quoted at $37.50, Baltimore, for prompt, and $38 for forward delivery.

Billets.—A slightly better demand for prompt material is reported; there is also more business being figured on, and makers are encouraged with the outlook. Current orders, however, are almost entirely for prompt lots or for delivery beginning at once and extending over a limited period. Prices are well maintained, efforts to shade quotations being quite unsuccessful. For open hearth rolling billets, delivered in this vicinity, $25.40 is named, with ordinary forging billets at $30.40.

Plates.—Plate makers have been receiving a very fair run of business and have been fully able to maintain their recent productive rate of 75 to 80 per cent. of capacity. Orders for tank and boiler steel have been numerous, and specifications are of slightly better size. Specifications for car and bridge work are coming out more freely; in fact, more work of a general nature has, it is stated, been released. Prices are very firm at 1.55c. minimum for ordinary heavy plates, delivered in this vicinity.

Structural Material.—While there is some fairly good business pending in this territory no large contracts have been placed. The contract for the Curtis Building is still unclosed. Bids for the new building for the Baltimore Bargain House have been opened, but no awards made. The Reading Iron Company will erect a new mill building during the summer, for which, it is said, 1000 tons will be required. Requirements for the new Ritz-Carlton Hotel, in this city, have not yet been announced. There has been a very fair run of miscellaneous orders, and the outlook is more encouraging. Prices for plain shapes are firm at 1.55c., minimum, for delivery in this territory, but fabricated prices are said to be low. It is understood that 1.96c. per pound, delivered, was named for the Baltimore Bargain House contract, covering fabrication and painting, but not including erection.

Sheets.—Orders showed an increase during the week, but are still below the capacity of mills in this district. Current business is confined to day to day orders, which are almost entirely for small and moderate lots. Prices are being firmly maintained, Eastern makers naming the following range for prompt deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Quite a fair proportion of business is being offered both in steel and refined iron bars. Eastern bar iron mills are gradually advancing prices, and while 1.30c., mill, can still be done for specifications of a desirable nature, a larger proportion of makers are now holding at 1.35c., mill. For delivery in this vicinity, quotations for refined iron bars still range from 1.37½c. to 1.42½c. Steel bars are firm at 1.55c., delivered.

Coke.—The demand for both furnace and foundry coke shows an improvement, particularly furnace coke, for which several large inquiries are out, one Eastern concern being in the market for 150,000 tons for delivery over 12 months. Several smaller consumers are also in the market. The demand for foundry coke, while not large individually, is broadening. Prices are on the upward move; there is less spot coke available, and prices for both prompt and forward delivery are slightly higher, furnace coke ranging from $1.65 to $1.80 per net ton, at oven, for prompt, and $1.80 to $2 for forward shipment. Foundry coke is firm at $2.20 to $2.40, at oven. The following range, per net ton, is named for deliveries in this vicinity:

Connellsville furnace coke	$3.90 to $4.25
Foundry coke:	4.40 to 4.65
Mountain furnace coke	3.50 to 3.85
Foundry coke	4.00 to 4.25

Old Material.—The recent excitement in the market has quieted down. Transactions during the week were largely confined to small lots, and in the majority of cases recent quotations were fully maintained, the only exception being in heavy melting steel, which sold in moderate lots at 50c. and 75c. under last week's top price. Melters are offering $14, delivered, for No. 1 heavy melting steel, and sales are reported at $14.25, although the majority of the sellers hold at $14.50, delivered. One interesting transaction was the purchase of a cargo of about 2000 tons of Panama scrap, by the Alan Wood Iron & Steel Company, at $13.61 on dock in this city, to which must be added 60c. freight to destination. Rolling mill scrap has been moderately active, turnings and borings showing a slight advance owing to increased demand. The general tone of the market is good, and an early betterment in the demand is anticipated. The following range of prices about represents the market for deliveries in buyers' yards, Eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to $1.35 per gross ton:

No. 1 steel scrap	$14.00 to $14.50
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	18.50 to 19.00
Old steel axles	21.00 to 21.50
Old iron axles	26.00 to 27.00*
Old iron rails	18.50 to 19.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	17.50 to 18.00
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	12.25 to 12.75
No. 2 light iron	8.00 to 8.50*
Wrought turnings	10.25 to 10.75
Cast borings	10.00 to 10.50
Machinery cast	14.50 to 15.00
Railroad malleable	12.50 to 13.00*
Grate bars	12.00 to 12.50
Stove plate	11.50 to 12.00

* Nominal.

Matthew Addy & Co., Real Estate Trust Building, Philadelphia, Pa., have been appointed exclusive selling agents in the Philadelphia territory for Clare Old Basin Connellsville foundry coke, produced by the Clare Coke Company, Trauger, Pa.

Birmingham

BIRMINGHAM, ALA., March 6, 1911.

Pig Iron.—The price of $11.50, Birmingham, for deliveries after the first half, has become effective in this market, and prompt or nearby deliveries have a tendency to advance. The aggregate of sales for the past week was very satisfactory, and in view of the fact that the bulk of the tonnage placed went to the concerns who would ordinarily be most likely to make concessions, owing to the stocks on hand, the situation as a whole is considered very materially improved. All stock reports as of March 1 are not yet in hand, but those who have reported show a decrease in the month of February. The movement so far this month has been at a rate in excess of that for the month just ended, and the tonnage now actually on books for shipment in the next 90 days is considerably larger than the anticipated output; this is after taking into consideration the addition of one active stack March 1 and another stack which is to be blown in March 15 to 20. The interest recently manifested by the manufacturers of cast iron pipe has had to strengthen the situation, as it is understood that the consumption by such concerns will be materially increased at an early date. An inquiry for 1000 tons of No. 4 foundry from such a manufacturer as just mentioned is now pending, owing to the inability of any one of the local producers to furnish such a quantity within the time required. The price for No. 4 foundry and for the lower grades for any delivery is practically established on the $11.50, Birmingham, basis for No. 2. All quotations on future shipments are made with some reluctance. There is considerable credence given to rumors relative to the merger of certain producing interests at this time, by reason of the presence in this district of the officials of the concerns interested, but nothing definite in that connection has yet been made public. The developments in this regard are being awaited with much interest by all local producers, as the properties to be affected are among the most valuable in this district.

Cast Iron Pipe.—Announcements of proposed lettings at Fort Worth, Texas; Nashville, Tenn., and Rockmar, Ga., have been received, while the demand for small lots continues good. By reason of the advance in asking prices for pig iron for future deliveries the pipe manufacturers have advanced their asking prices, and the market for small lots

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is believed to be correctly represented by an advance of $1 per ton in the quotation on small sizes. The status of prices for large contracts cannot be stated with accuracy, by reason of the fact that no large orders have recently been placed, but producers will no doubt insist on higher figures than have ruled heretofore. No definite announcement has been made relative to the resumption of operations at the plants now closed down, but it is understood that all will be operated to normal capacity at an early date. We quote revised asking prices as follows, per net ton, on cars here, for water pipe, with the usual advance of $1 per ton for gas pipe: 4 to 6 in., $22; 8 to 12 in., $20; over 12-in., average $19.

Old Material.—The average price received the past week indicates that the market has improved very materially and dealers are less disposed to move their accumulations. The aggregate of shipments was fairly satisfactory and effected a decrease in the total of stocks. The schedule of asking prices has not been changed, but they are believed to be firm, as follows, per gross ton, f.o.b. cars here:

Old iron axles	$14.00 to $14.50
Old iron rails	12.50 to 13.00
Old steel axles	12.50 to 13.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.00 to 10.50
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, March 7, 1911.

Iron Ore.—No inquiries for ore are developing, and it is doubtful if the market will open up within the next month or six weeks. In previous years the bulk of the ore for the season has been sold within a very few weeks, but this year it is expected that buying will drag along, as many consumers will not need any additional ore until late in the season. The Pittsburgh Steamship Company is getting its boats ready for the opening of navigation and will probably make a start with some of its large carriers about April 20. Last year the first boats started April 15. Nothing is being done as yet regarding ore prices. Shipments from the docks continue light. We quote prices as follows: Old range Bessemer, $5; Mesaba Bessemer, $4.75; old range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—There is not a great deal of activity, but in spite of this the general tone of the market is firmer than two weeks ago. A few sales of small lots of foundry and malleable grades are reported, mostly for second and third quarter deliveries. Large inquiries, however, are lacking. There is still considerable uncertainty among buyers and sellers regarding the last half. Some furnaces are still declining to quote prices for delivery beyond July 1. Those that are willing to take on tonnage for the last half are quoting No. 2 foundry at $14.50, Valley furnace, for that delivery. While many consumers appear to be willing to buy for their last half requirements at current prices, few are willing to pay an advance of 50c. a ton for that delivery, and after feeling the market and being given the higher quotations have allowed the matter of placing contracts for the last half to drop for the present. While conditions in the general foundry trade show some improvement, orders are not very plentiful, and many foundrymen feel that a little later they will be able to place contracts for the last half at current prices. For delivery until July 1 No. 2 foundry is firm at $13.75 to $14, Cleveland and Valley furnace, nearly all of the furnaces holding to the higher price. We note the sale of one 300-ton lot by a local furnace for shipment to a point near the Valley at $14 for No. 2 for the second quarter. Southern iron is quoted at $11.25, Birmingham, for No. 2 for the third quarter, which can probably be shaded, and $11.50 for the last half. A northern Ohio implement maker is in the market for about 1000 tons of Southern iron for delivery through the second, third and fourth quarters. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	$14.00 to 14.25
Northern foundry, No. 3	13.75 to 14.00
Gray forge	13.75 to 14.00
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	18.00

Coke.—The market continues quiet. The only demand is in foundry grades, and that mostly for small lots for spot shipment. We quote standard Connellsville furnace coke at $1.55 to $1.60, per net ton, at oven, for spot shipment, and $1.75 to $2 for the last half. Connellsville 72-hour foundry coke is held at $2 to $2.15 for spot shipment and $2.25 to $2.50 for the remainder of the year.

Finished Iron and Steel.—Mill agencies are getting a good volume of small orders for all lines of finished products, the aggregate being about the same as in the previous two or three weeks. The railroad rate decisions seem to have had no injurious effect on the market; in fact, the general feeling is more optimistic than it has been for some time. Manufacturers in a number of lines report a better volume of inquiries and much improvement in the outlook. The leading interest reports an increase of 42 per cent. in tonnage in actual orders booked in its Cleveland office in February, as compared with January, and this probably fairly represents the increased demand in this territory. The Nickel Plate Railroad has placed orders for 5000 tons of ferrotitanium rails, the tonnage being equally divided between the Illinois Steel Company and the Lackawanna Steel Company. The former company was given the contract for the track supplies for the entire tonnage. The Cleveland, Alliance & Mahoning Valley Railroad Company has an inquiry out for 2000 tons of 70-lb. rails for a new interurban line. In structural lines the outlook is improving. The Lake Shore Railroad has placed the contract for about 1800 tons of structural material for bridges for grade crossing elimination in Cleveland and Chicago. Of this, 800 tons went to the American Bridge Company and the remainder was divided between the King Bridge Company and the McClintic-Marshall Construction Company. It has been decided to go ahead with the superstructure of the new City Hall in Cleveland early this spring, and bids for the structural steel will probably be asked for shortly. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for both black and galvanized sheets has become quite active and mills are maintaining regular prices. Occasionally there is a report of shading of $1 a ton by a jobber whose contract with mills at the old prices has not expired. Efforts to stiffen up rivet prices appear so far to have been unsuccessful and regular quotations are still being shaded $2 a ton. The demand for iron bars is moderate. Prices are fairly firm at 1.30c. at mill.

Old Material.—The recent flurry has entirely subsided and the market is generally quiet. The advance in quotations is being nominally maintained, but values are somewhat unsettled and the market is not firm. Both dealers and mills are holding off to see what effect the rate decisions will have on the placing of orders by railroads. Dealers are not eager to buy country mixed scrap at present. Some small lot sales to consumers are reported, but very little business is coming from local mills. The Norfolk & Western Railroad will close March 16 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.00 to $14.50
Old iron rails	17.00 to 17.50
Steel car axles	19.50 to 20.00
Heavy melting steel	13.25 to 13.50
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings	7.50 to 8.00
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.25
No. 1 cast	12.00 to 12.50
Stove plate	11.00 to 11.25
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, March 8, 1911.

Pig Iron.—The improvement previously noted has apparently not quite kept up to the standard set in the last two weeks of February. Inquiries have thinned down somewhat and sales have not been so numerous. But even then the past week was far ahead of the corresponding period of January and February, and it is believed that the market is only experiencing a temporary lull in activity. Ohio silvery is still in demand, and among recent sales are 1500 tons going to northern Ohio, three lots of 200, 500 and 1000 tons respectively, for Michigan consumers, and 200 tons for an Illinois melter, with shipments generally extending through the third quarter. Based on 8 per cent. silicon, prices range from $16.50 to $17 at furnace. Malleable is unchanged at $14, and at this figure an Indiana manufacturer contracted for 2000 tons, deliveries running from March to June, inclusive. Southern foundry continues more active than Northern, and included in recent sales are 500 tons for a northern Ohio melter, two similar sized lots for Illinois users for second and third quarter shipments, and 1200 tons for an Illinois manufacturer, July to December delivery. A Northwestern farm implement maker also took 2200 tons for third quarter. As a result, Southern furnaces

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three to five months, at prices above recent quotations. The minimum for this grade is now $14, furnace, equal to $14.50 to $15, delivered in this vicinity, dependent on point of destination. A further movement in basic iron is noted; purchases have been largely on the part of one Eastern plate mill, which has bought from 12,000 to 15,000 tons, at $15.25, delivered, for shipment extending over various periods, which may be summed up as practically second and third quarter. One purchase of about 3000 tons for early delivery was also made at something over $15, delivered. The latter quotation has now practically disappeared and the principal sellers contend that they have all the business they want at $15.25, and are now holding firmly at $15.50, delivered. Negotiations are pending for further supplies, but business moves slowly, as prices gradually advance. Small sales of low phosphorus iron ore are reported, and prices of this grade also show a slight upward movement. The following range of prices is named for standard brands, delivered in buyers' yards in this district, delivery for the greater part being confined to prompt and second quarter:

Eastern Pennsylvania, No. 2 X foundry	$15.50 to $16.00
Eastern Pennsylvania, No. 2 plain	15.25 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.50 to 15.00
Basic	15.25 to 15.50
Standard low phosphorus	21.25 to 21.75

Ferromanganese.—No fresh demand is reported from consumers in this district, and the market is nominally quoted at $37.50, Baltimore, for prompt, and $38 for forward delivery.

Billets.—A slightly better demand for prompt material is reported; there is also more business being figured on, and makers are encouraged with the outlook. Current orders, however, are almost entirely for prompt lots or for delivery beginning at once and extending over a limited period. Prices are well maintained, efforts to shade quotations being quite unsuccessful. For open hearth rolling billets, delivered in this vicinity, $25.40 is named, with ordinary forging billets at $30.40.

Plates.—Plate makers have been receiving a very fair run of business and have been fully able to maintain their recent productive rate of 75 to 80 per cent. of capacity. Orders for tank and boiler steel have been numerous, and specifications are of slightly better size. Specifications for car and bridge work are coming out more freely; in fact, more work of a general nature has, it is stated, been released. Prices are very firm at 1.55c. minimum for ordinary heavy plates, delivered in this vicinity.

Structural Material.—While there is some fairly good business pending in this territory no large contracts have been placed. The contract for the Curtis Building is still unclosed. Bids for the new building for the Baltimore Bargain House have been opened, but no awards made. The Reading Iron Company will erect a new mill building during the summer, for which, it is said, 1000 tons will be required. Requirements for the new Ritz-Carlton Hotel, in this city, have not yet been announced. There has been a very fair run of miscellaneous orders, and the outlook is more encouraging. Prices for plain shapes are firm at 1.55c., minimum, for delivery in this territory, but fabricated prices are said to be low. It is understood that 1.96c. per pound, delivered, was named for the Baltimore Bargain House contract, covering fabrication and painting, but not including erection.

Sheets.—Orders showed an increase during the week, but are still below the capacity of mills in this district. Current business is confined to day to day orders, which are almost entirely for small and moderate lots. Prices are being firmly maintained, Eastern makers naming the following range for prompt deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Quite a fair proportion of business is being offered both in steel and refined iron bars. Eastern bar iron mills are gradually advancing prices, and while 1.30c., mill, can still be done for specifications of a desirable nature, a larger proportion of makers are now holding at 1.35c., mill. For delivery in this vicinity, quotations for refined iron bars still range from 1.37½c. to 1.42½c. Steel bars are firm at 1.55c., delivered.

Coke.—The demand for both furnace and foundry coke shows an improvement, particularly furnace coke, for which several large inquiries are out, one Eastern concern being in the market for 150,000 tons for delivery over 12 months. Several smaller consumers are also in the market. The demand for foundry coke, while not large individually, is broadening. Prices are on the upward move; there is less spot coke available, and prices for both prompt and forward delivery are slightly higher, furnace coke ranging from $1.65 to $1.80 per net ton, at oven, for prompt, and $1.80 to $2 for forward shipment. Foundry coke is firm at $2.20 to $2.40, at oven. The following range, per net ton, is named for deliveries in this vicinity:

Connellsville furnace coke	$3.90 to $4.25
Foundry coke	4.40 to 4.85
Mountain furnace coke	3.50 to 3.85
Foundry coke	4.00 to 4.25

Old Material.—The recent excitement in the market has quieted down. Transactions during the week were largely confined to small lots, and in the majority of cases recent quotations were fully maintained, the only exception being in heavy melting steel, which sold in moderate lots at 50c. and 75c. under last week's top price. Melters are offering $14, delivered, for No. 1 heavy melting steel, and sales are reported at $14.25, although the majority of the sellers hold at $14.50, delivered. One interesting transaction was the purchase of a cargo of about 2000 tons of Panama scrap, by the Alan Wood Iron & Steel Company, at $13.61 on dock in this city, to which must be added 60c. freight to destination. Rolling mill scrap has been moderately active, turnings and borings showing a slight advance owing to increased demand. The general tone of the market is good, and an early betterment in the demand is anticipated. The following range of prices about represents the market for deliveries in buyers' yards, Eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to $1.35 per gross ton:

No. 1 steel scrap	$14.00 to $14.50
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	18.50 to 19.00
Old steel axles	21.00 to 21.50
Old iron axles	26.00 to 27.00*
Old iron rails	18.50 to 19.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	17.50 to 18.00
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	12.25 to 12.75
No. 2 light iron	8.00 to 8.50*
Wrought turnings	10.25 to 10.75
Cast borings	10.00 to 10.50
Machinery cast	14.50 to 15.00
Railroad malleable	12.50 to 13.00*
Grate bars	12.00 to 12.50
Stove plate	11.50 to 12.00

* Nominal.

Matthew Addy & Co., Real Estate Trust Building, Philadelphia, Pa., have been appointed exclusive selling agents in the Philadelphia territory for Clare Old Basin Connellsville foundry coke, produced by the Clare Coke Company, Trauger, Pa.

Birmingham

BIRMINGHAM, ALA., March 6, 1911.

Pig Iron.—The price of $11.50, Birmingham, for deliveries after the first half, has become effective in this market, and prompt or nearby deliveries have a tendency to advance. The aggregate of sales for the past week was very satisfactory, and in view of the fact that the bulk of the tonnage placed went to the concerns who would ordinarily be most likely to make concessions, owing to the stocks on hand, the situation as a whole is considered very materially improved. All stock reports as of March 1 are not yet in hand, but those who have reported show a decrease in the month of February. The movement so far this month has been at a rate in excess of that for the month just ended, and the tonnage now actually on books for shipment in the next 90 days is considerably larger than the anticipated output; this is after taking into consideration the addition of one active stack March 1 and another stack which is to be blown in March 15 to 20. The interest recently manifested by the manufacturers of cast iron pipe has had to strengthen the situation, as it is understood that the consumption by such concerns will be materially increased at an early date. An inquiry for 1000 tons of No. 4 foundry from such a manufacturer as just mentioned is now pending, owing to the inability of any one of the local producers to furnish such a quantity within the time required. The price for No. 4 foundry and for the lower grades for any delivery is practically established on the $11.50, Birmingham, basis for No. 2. All quotations on future shipments are made with some reluctance. There is considerable credence given to rumors relative to the merger of certain producing interests at this time, by reason of the presence in this district of the officials of the concerns interested, but nothing definite in that connection has yet been made public. The developments in this regard are being awaited with much interest by all local producers, as the properties to be affected are among the most valuable in this district.

Cast Iron Pipe.—Announcements of proposed lettings at Fort Worth, Texas; Nashville, Tenn., and Rockmar, Ga., have been received, while the demand for small lots continues good. By reason of the advance in asking prices for pig iron for future deliveries the pipe manufacturers have advanced their asking prices, and the market for small lots

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is believed to be correctly represented by an advance of $1 per ton in the quotation on small sizes. The status of prices for large contracts cannot be stated with accuracy, by reason of the fact that no large orders have recently been placed, but producers will no doubt insist on higher figures than have ruled heretofore. No definite announcement has been made relative to the resumption of operations at the plants now closed down, but it is understood that all will be operated to normal capacity at an early date. We quote revised asking prices as follows, per net ton, on cars here, for water pipe, with the usual advance of $1 per ton for gas pipe: 4 to 6 in., $22; 8 to 12 in., $20; over 12-in., average $19.

Old Material.—The average price received the past week indicates that the market has improved very materially and dealers are less disposed to move their accumulations. The aggregate of shipments was fairly satisfactory and effected a decrease in the total of stocks. The schedule of asking prices has not been changed, but they are believed to be firm, as follows, per gross ton, f.o.b. cars here:

Old iron axles	$14.00 to $14.50
Old iron rails	12.50 to 13.00
Old steel axles	12.50 to 13.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.00 to 10.50
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

Cleveland

CLEVELAND, OHIO, March 7, 1911.

Iron Ore.—No inquiries for ore are developing, and it is doubtful if the market will open up within the next month or six weeks. In previous years the bulk of the ore for the season has been sold within a very few weeks, but this year it is expected that buying will drag along, as many consumers will not need any additional ore until late in the season. The Pittsburgh Steamship Company is getting its boats ready for the opening of navigation and will probably make a start with some of its large carriers about April 20. Last year the first boats started April 15. Nothing is being done as yet regarding ore prices. Shipments from the docks continue light. We quote prices as follows: Old range Bessemer, $5; Mesaba Bessemer, $4.75; old range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—There is not a great deal of activity, but in spite of this the general tone of the market is firmer than two weeks ago. A few sales of small lots of foundry and malleable grades are reported, mostly for second and third quarter deliveries. Large inquiries, however, are lacking. There is still considerable uncertainty among buyers and sellers regarding the last half. Some furnaces are still declining to quote prices for delivery beyond July 1. Those that are willing to take on tonnage for the last half are quoting No. 2 foundry at $14.50, Valley furnace, for that delivery. While many consumers appear to be willing to buy for their last half requirements at current prices, few are willing to pay an advance of 50c. a ton for that delivery, and after feeling the market and being given the higher quotations have allowed the matter of placing contracts for the last half to drop for the present. While conditions in the general foundry trade show some improvement, orders are not very plentiful, and many foundrymen feel that a little later they will be able to place contracts for the last half at current prices. For delivery until July 1 No. 2 foundry is firm at $13.75 to $14, Cleveland and Valley furnace, nearly all of the furnaces holding to the higher price. We note the sale of one 300-ton lot by a local furnace for shipment to a point near the Valley at $14 for No. 2 for the second quarter. Southern iron is quoted at $11.25, Birmingham, for No. 2 for the third quarter, which can probably be shaded, and $11.50 for the last half. A northern Ohio implement maker is in the market for about 1000 tons of Southern iron for delivery through the second, third and fourth quarters. For prompt shipment and the second quarter we quote, delivered, Cleveland, as follows:

Bessemer	$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	$14.00 to 14.25
Northern foundry, No. 3	13.75 to 14.00
Gray forge	13.75 to 14.00
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	18.00

Coke.—The market continues quiet. The only demand is in foundry grades, and that mostly for small lots for spot shipment. We quote standard Connellsville furnace coke at $1.55 to $1.60, per net ton, at oven, for spot shipment, and $1.75 to $2 for the last half. Connellsville 72-hour foundry coke is held at $2 to $2.15 for spot shipment and $2.25 to $2.50 for the remainder of the year.

Finished Iron and Steel.—Mill agencies are getting a good volume of small orders for all lines of finished products, the aggregate being about the same as in the previous two or three weeks. The railroad rate decisions seem to have had no injurious effect on the market; in fact, the general feeling is more optimistic than it has been for some time. Manufacturers in a number of lines report a better volume of inquiries and much improvement in the outlook. The leading interest reports an increase of 42 per cent. in tonnage in actual orders booked in its Cleveland office in February, as compared with January, and this probably fairly represents the increased demand in this territory. The Nickel Plate Railroad has placed orders for 5000 tons of ferrotitanium rails, the tonnage being equally divided between the Illinois Steel Company and the Lackawanna Steel Company. The former company was given the contract for the track supplies for the entire tonnage. The Cleveland, Alliance & Mahoning Valley Railroad Company has an inquiry out for 2000 tons of 70-lb. rails for a new interurban line. In structural lines the outlook is improving. The Lake Shore Railroad has placed the contract for about 1800 tons of structural material for bridges for grade crossing elimination in Cleveland and Chicago. Of this, 800 tons went to the American Bridge Company and the remainder was divided between the King Bridge Company and the McClintic-Marshall Construction Company. It has been decided to go ahead with the superstructure of the new City Hall in Cleveland early this spring, and bids for the structural steel will probably be asked for shortly. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The demand for both black and galvanized sheets has become quite active and mills are maintaining regular prices. Occasionally there is a report of shading of $1 a ton by a jobber whose contract with mills at the old prices has not expired. Efforts to stiffen up rivet prices appear so far to have been unsuccessful and regular quotations are still being shaded $2 a ton. The demand for iron bars is moderate. Prices are fairly firm at 1.30c. at mill.

Old Material.—The recent flurry has entirely subsided and the market is generally quiet. The advance in quotations is being nominally maintained, but values are somewhat unsettled and the market is not firm. Both dealers and mills are holding off to see what effect the rate decisions will have on the placing of orders by railroads. Dealers are not eager to buy country mixed scrap at present. Some small lot sales to consumers are reported, but very little business is coming from local mills. The Norfolk & Western Railroad will close March 16 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.00 to $14.50
Old iron rails	17.50 to 17.50
Steel car axles	19.50 to 20.00
Heavy melting steel	13.25 to 13.50
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings	7.50 to 8.00
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.25
No. 1 cast	12.00 to 12.50
Stove plate	11.00 to 11.25
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, March 8, 1911.

Pig Iron.—The improvement previously noted has apparently not quite kept up to the standard set in the last two weeks of February. Inquiries have thinned down somewhat and sales have not been so numerous. But even then the past week was far ahead of the corresponding period of January and February, and it is believed that the market is only experiencing a temporary lull in activity. Ohio silvery is still in demand, and among recent sales are 1500 tons going to northern Ohio, three lots of 200, 500 and 1000 tons respectively, for Michigan consumers, and 200 tons for an Illinois melter, with shipments generally extending through the third quarter. Based on 8 per cent. silicon, prices range from $16.50 to $17 at furnace. Malleable is unchanged at $14, and at this figure an Indiana manufacturer contracted for 2000 tons, deliveries running from March to June, inclusive. Southern foundry continues more active than Northern, and included in recent sales are 500 tons for a northern Ohio melter, two similar sized lots for Illinois users for second and third quarter shipments, and 1200 tons for an Illinois manufacturer, July to December delivery. A Northwestern farm implement maker also took 2200 tons for third quarter. As a result, Southern furnaces

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are asking $11.50, Birmingham, for any delivery after July 1, but it is known that several lots of No. 2 foundry have been sold at $11 for the third quarter and around $11.25 for the last half. The St. Louis territory contributed an order for 1000 tons of car wheel iron and some scattering orders for Northern foundry have been booked at $14, Ironton, which is the quoted figure up to July, but most of the furnaces feel disinclined to take on business at this figure for any later delivery. Illinois territory furnished an inquiry for 2000 to 3000 tons of basic pig for third and fourth quarter shipment, and there are a number of small inquiries out from nearby melters for both Northern and Southern foundry iron. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	17.70
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

(*By Mail.*)

Coke.—The reported closing of a contract for furnace coke, averaging about 2000 tons per month for the remainder of the year, has helped to stiffen the Connellsville price, which has been lower than the quotable figures in other fields. This contract was made by an Eastern interest, and it is stated that a much larger one for Connellsville furnace coke, to be shipped East, was closed by an agency in another center, deliveries to be made during the next 12 months. Small quantities of foundry coke have been contracted for, but no large amounts are expected to be bought for some time. Furnace coke is now quotable in all three fields around $1.60 to $1.65 per net ton at oven for spot shipment, with probably a 5c. to 10c. premium being asked by Pocahontas operators. Foundry coke is sold at $1.90 to $2 for immediate shipment, with the usual advance of 25c. per net ton asked on contract shipments. These prices apply to the Connellsville, Pocahontas and Wise County fields.

Finished Material.—With the exception of plates, which appear to be moving slowly, there can be no doubt that the situation is steadily improving. Structural material is in better demand, and steel bars are not slow sellers. Hoops and bands also continue to show improvement. The Pittsburgh mill price is unchanged at 1.40c., and on structural material and steel bars local warehouses are asking from 1.80c. to 1.95c.

Old Material.—It is stated that the settlement of the railroad freight rate question has adversely affected the scrap market, but this does not hold good, so far as prices are concerned, which are firm at figures previously quoted. Cast borings were in demand last week more than any other class of scrap. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	$12.00 to $12.50
Cast borings, net ton	5.00 to 5.50
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 11.50
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Bundled sheet scrap, gross ton	8.50 to 9.00
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	21.50 to 22.50
Old car wheels, gross ton	12.00 to 12.50
Heavy melting steel scrap, gross ton	11.00 to 11.50

St. Louis

ST. LOUIS, March 6, 1911.

Reviewing the past month, the leading pig iron houses and the principal steel interest state they did a satisfactory business, and merchant sellers report an active trade, with the outlook good for the present month. The bank clearings, which show a gain of 14 per cent. over February, 1910, reflect the improvement going on in general business in this city. Railroad buying of rails, equipment and track material is gaining in volume. Money is in plentiful supply, and collections are reported good. The outlook for the coming winter wheat crop is favorable, since its condition is quite generally reported as satisfactory.

Pig Iron.—Interest in the pig iron market continues unabated. Inquiries during the past week were reported to be quite numerous, and after making due allowance for such as have in view keeping posted as to prices and prospects of an advance, the leading sellers express themselves as being satisfied with the indications for continued buying. In the aggregate the inquiries totaled about 10,000 tons, mainly for last half delivery. This does not include pending inquiries, among which is one for 6000 tons of basic, already reported. A sale of 1200 tons of Southern foundry to a local company is reported for shipment over the last half. An inquiry is out for 500 tons of Southern No. 2 foundry for shipment from April to August, and the same tonnage of Northern malleable for shipment from May to September. The advance asked for Virginia iron, and the difficulty in working last half business, except at a premium above the price for shipment over the remainder of the first half, are causing a firmer tone. A feature of the situation is that the position is shifting from a buyers' to a sellers' market, a condition which has not obtained for nearly a year, during which time the bulk of the business transacted has been done through the acceptance of firm offers. We continue quotations for Southern No. 2 foundry for shipment over the remainder of the first half, $11; over the third quarter, $11.25; for fourth quarter, $11.50; over the second half, $11.50, f.o.b. Birmingham. Low grade Southern iron is reported in short supply; Northern iron is quoted at $14, Ironton, for No. 2 foundry.

Coke.—No large inquiries or sales are reported, but merchant sellers state that a fairly good business is being done with small consumers, one house reporting sales for the week of 20 carloads to various outside parties. We quote selected Connellsville 72-hour foundry at $2.15 per net ton, f.o.b., oven, for shipment over the remainder of the year; special brands and carload lots 25c. to 50c. per ton higher.

Finished Iron and Steel.—The improvement in the demand is gaining ground. Among the transactions for the past week was the closing of a contract with the Midland Valley Railroad for 100 miles of standard rails. Two or three other railroads have inquiries out for round lots which will soon be placed. Lumber interests are putting in more inquiries for light rails. There is more doing in structural material. Steel bars are in good demand, caused by the advance in iron. The call for track material is increasing.

Old Material.—The speculative interest existing in other markets is reflected in the stronger views of leading sellers of scrap iron and steel, and tends to check free buying by consumers. Holders look for a more active demand in the near future. They regard the pig iron market as hardening, and believe that old materials should share in the prospective appreciation in prices. Old car wheels are in especial request by accumulative buyers. Several items in the list have advanced in price, including relaying rails. The following railroad lists are on the market: Vandalia Line, 200 tons; St. Louis & San Francisco, 100 tons; Wabash, 500 tons. Dealers' selling prices are as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$14.50 to $15.00
Old steel rails, rerolling	13.50 to 14.00
Old steel rails, less than 3 ft	12.50 to 13.00
Relaying rails, standard sections, subject to inspection	23.50 to 24.00
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50

The following quotations are per net ton:

Iron fish plates	$12.00 to $12.50
Iron car axles	19.00 to 19.50
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Railway springs	10.50 to 11.00
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	9.50 to 10.00
Mixed borings	5.00 to 5.50
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	9.00 to 9.50
Railroad sheet and tank scrap	9.00 to 9.50
Railroad grate bars	9.50 to 10.00
Machine shop turnings	8.00 to 8.50

The Mt. Vernon Car Company has just closed a contract for 100 freight cars.

The United States Treasury Department has selected, it is reported, the site for the new subtreasury building, for which Congress appropriated $300,000. The location given is the corner of Fourth and Chestnut streets. The cost of the building will be $1,500,000.

On Tuesday the Hammur Brothers White Lead Company shipped a solid train load of lead to New England over the Baltimore & Ohio Railroad.

Of concentrated zinc ore 234,418 tons were shipped to the various smelters in 1910 from the southwest Missouri field, exceeding the record of all other States combined. More smelters are needed to conserve by-products now lost in preparing blends.

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Buffalo

BUFFALO, N. Y., March 7, 1911.

Pig Iron.—A more optimistic feeling is evident among producers; price views are firming and less aggressiveness is apparent in the seeking of business. Prices have stiffened about 25c. per ton for the current half and business for the last half is not being solicited. Most furnaces report good inquiry, although many buyers have covered for first half requirements. One interest reports inquiries aggregating 50,000 tons under negotiation for foundry grades and malleable, with some basic, including 30,000 tons from a large concern using both foundry and malleable irons, also the practical closing of a contract for 10,000 tons of basic and malleable for a manufacturer of railroad material. Another furnace interest states that a number of medium sized orders have been placed by New England consumers, including one of 1000 tons and one of 750 tons of foundry grades. Other producers state that considerable interest is being manifested in malleable as well as foundry grades, although the firming tendency in prices is having a restraining effect on placement. We quote as follows for first half delivery, f.o.b. Buffalo:

No. 1 X foundry	$14.75 to $15.00
No. 2 X foundry	14.50 to 14.75
No. 2 plain	14.00 to 14.50
No. 3 foundry	14.00 to 14.25
Gray forge	13.75 to 14.00
Malleable	14.50 to 15.00
Basic	14.50 to 15.00
Charcoal	17.00 to 17.50

Finished Iron and Steel.—Specifications are coming forward more freely than for the previous week, particularly for bar products and plain structural material, and a good increase in small lot new business for first half delivery is noted. Prices are firm, and there is a growing disposition to contract for forward needs. The advance of $1 per ton on wire products has had no appreciable effect in this market, as practically all users were under contract at the old prices for their spring requirements. The demand for black and galvanized sheets continues active. Canadian export trade also continues to be of good proportions. In fabricated structural materials a slight improvement in demand is noted, and considerable small lot business is developing. Specifications are being figured this week for two or three local factory buildings requiring small tonnages, and specifications will soon be out for steel for the children's hospital building for the Buffalo Orphan Asylum. Figures are being taken this week for about 200 tons of steel for the exposition buildings at Rochester. Plans for the Eastman Kodak Company's factory building No. 42, at Rochester, for which bids for steel frame construction have been in for several weeks, have been changed to specify reinforced concrete construction, and the contract has been placed.

Old Material.—The market has recovered from the lull in demand reported last week, and orders for current consumption are coming in more freely, although there does not appear to be any large demand for forward requirements. Shipments on contracts are going forward in good volume. There has been no material change in prices from the schedule reported last week. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.75 to $14.25
Low phosphorus steel	18.00 to 18.50
No. 1 railroad wrought	15.75 to 16.25
No. 1 railroad and machinery cast scrap	14.75 to 15.25
Old steel axles	20.50 to 21.50
Old iron axles	24.00 to 25.00
Old car wheels	15.00 to 15.50
Railroad malleable	14.25 to 14.75
Boiler plate	11.75 to 12.25
Locomotive grate bars	11.75 to 12.25
Pipe	11.25 to 11.75
Wrought iron and soft steel turnings	7.50 to 8.00
Clean cast borings	7.00 to 7.25

The German Iron Market

BERLIN, February 23, 1911.

The great question of the hour for the iron trade, the renewal of the bar iron convention, has not yet been fully settled. The further conference for the subject met yesterday, but only a partial agreement was reached. It appears, however, that the larger plan had in mind by many of the companies, namely, to effect a firmer organization with a common selling agency, has failed. Most of the companies consented to a prolongation of the present price arrangement till the end of June; and it was also agreed to make a reduction in prices to 105 marks per ton, shipping basis Oberhausen, which means a cut of 7 to 9 marks per ton, but the consent of several companies is still necessary before this arrangement becomes valid. An agreement was also reached respecting the drawback on exported goods, the Steel Works Union contributing 2.50 marks and the open-hearth works 1.50 marks per ton toward a drawback of 4 marks; but the further details in the case are not accessible. The most significant fact in all this is that the bar manufacturers are willing to make a considerable cut in prices—a clear indication that the trade situation has weakened. This reduction for the home market, however, is doubtless a recognition of the fact that prices for export have been kept at a considerably lower level than for home consumption.

The Steel Works Union met at Düsseldorf to-day and gave out the usual monthly report. The foreign market shows a satisfactory demand and still tries to place orders for long periods. In steel rails it is mentioned that the requirements of the Prussian authorities for 1911 turned out to be 50,000 to 60,000 tons greater than for 1910. The calls for delivery of light rails have greatly increased within the past few weeks and a number of good foreign contracts have again been taken, with further inquiries on hand. Business in grooved rails is good; some big contracts with both home and foreign buyers have recently been made, but foreign competition continues to keep prices low in outside markets. There is a considerable improvement in the demand for mining rails, and the arrivals of specifications within the past few weeks have been very heavy. The market for structural shapes remains quiet, with little disposition on the part of consumers to place orders. Shipments this month, however, have been a little better than hitherto. The question of fixing prices and opening sales for the next quarter was to have been decided to-day, but it was postponed for two weeks.

The big Gelsenkirchen Company, the second largest iron and coal company in Germany, has just announced a dividend of 10 per cent. for 1910, which compares with 9 per cent. for 1909. It had gross profits of $10,370,000, or about $1,500,000 more than for 1909. The Aumetz-Friede Company of Lorraine, which has forged to the front strongly within a few years, reports net profits of $1,180,000 for the past half year, which is a gain of $157,000.

New York

NEW YORK, March 8, 1911.

Pig Iron.—Foundries seem fairly well supplied with iron for the next three or four months, and on neither side of the market is there strong disposition to do business for the second half of the year. Producers expect to get higher prices in that period and consumers are not yet persuaded that they should pay 50c. to $1 more for second half delivery than for second quarter. Several transactions of 1000 tons are reported for the past week. One New England foundry has bought that amount, chiefly high phosphorus iron. Two inquiries from New York State foundries are before the trade. A pump interest is in the market for 1000 tons of No. 2 for an Ohio plant. Several transactions in pipe iron are reported, but these were largely put through in eastern Pennsylvania and involved Southern iron for the most part. Eastern Pennsylvania furnaces have secured advances of 25c. or more over prices recently prevailing, and there is more firmness in the attitude of Buffalo furnaces, some of which quote from 50c. to $1 a ton above the extremely low prices of two or three weeks ago. Virginia furnaces are firmer at $13 for No. 2 and are asking $13.25 to $13.50 for delivery after the middle of the year. The foundry situation seems slightly improved, but there are still enough factors of uncertainty to make buyers move cautiously. We quote for tidewater delivery as follows: Northern No. 1 foundry, $15.50 to $15.75; No. 2 X, $15.25 to $15.50; No. 2 plain, $14.75 to $15; Southern No. 1 foundry, $15.50 to $15.75; No. 2, $15 to $15.25.

Steel Rails.—The New York, Westchester & Boston, after months of negotiating, has bought 6000 tons of Bessemer rails from the Maryland Steel Company. The Pere Marquette will close for 17,000 tons this week, the greater part of it going to Buffalo. The Nickel Plate has bought 5000 tons, divided between South Chicago and Buffalo. The Manila Railroad contract for 10,000 tons was taken by the Lackawanna Steel Company. Export orders of the Steel Corporation amounted to 7000 tons for the week, including 2500 tons for Cuba. The Atlantic Coast Line has ordered 1650 tons additional, which will be rolled at Ensley, Ala. The Illinois Steel Company booked 15,000 tons last week, one contract, which was with a construction company, amounting to 7600 tons.

Ferroalloys.—There are inquiries for good round lots of ferrosilicon, and fair-sized sales have been made in this market at $54.50 to $55, Pittsburgh. Dealers here are stiffening their quotations in expectation of a higher market. Ferromanganese is in little demand, and is quoted from $37.50 to $38, Baltimore.

Finished Iron and Steel.—There has been no appreciable change in conditions in these lines in the past three

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weeks. Steel bar contracts from the larger buyers are slow in being placed, and the disinclination of jobbers to carry very much stock further reduces the new demand. Specifications thus far have been sufficient to occasion no shortening of capacity. Such business as is going in structural material is in active competition. Twenty bids were submitted for the Communipaw pier sheds for the Central Railroad of New Jersey, which will require 800 to 1000 tons. The Hay Foundry & Iron Works was low bidder, and is expected to receive the award. Hamilton & Chambers have the steel contract for the Kirkman Soap factory building, 200 tons, Brooklyn, N. Y.; Ravitch Brothers, 100 tons for a loft building on West Thirty-sixth street, New York, and Lewis F. Shoemaker & Co., 50 tons for a highway bridge for the New York, New Haven & Hartford at Windsor, Conn. The latter is also in the market for three small spans, the Boston & Maine two or three small bridges requiring perhaps 300 tons in all, and the Chicago, Milwaukee & St. Paul and the Canadian Pacific also have some small inquiries. The only large railroad inquiry for bridge material is from the Chicago, Rock Island & Pacific, which will need about 5000 tons for its 1911 requirements. Bids will close April 1 on 2700 tons for the Williamsburg Bridge terminal, New York, and the American Candy Company is inquiring for 2000 tons for a warehouse in Boston. Plans for the Masonic Temple, New York, are now being revised. The George A. Fuller Company holds the general contract, and about 600 tons will be needed. Quotations remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Store prices for plain material and plates, New York, are 1.85c. to 1.95c.

Cast Iron Pipe.—Rochester, N. Y., opens bids to-day on 2100 tons of a variety of sizes. Westbury, N. Y., will open bids March 20 on 630 tons of pipe, 76 fire hydrants and 58 gate valves and boxes. The general demand continues quiet. Prices appear to be no stronger. Carload lots of 6-in. are quoted at $21 to $22 per net ton, tidewater.

Old Material.—While general conditions have tended to quietness, some transactions are reported in heavy melting steel scrap. A few brokers having contracts for this class of material are pressing for shipments and certain consumers are apparently in need of a little stock. The largest steel mills in eastern Pennsylvania are evidently well supplied, and one of them has such an accumulation of cars in its yards that an embargo has been laid on further shipments there. Borings and turnings, especially turnings, are in good demand. The foundry trade is also purchasing in fair quantities. The rolling mills are still doing little in the market. Railroad lists now comng out are quite heavy, and it is felt that prices may yield somewhat in the presence of such an addition to the supply. The stock now in dealers' hands, nevertheless, is firmly held. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	$11.50 to $12.00
Heavy melting steel scrap	11.50 to 12.00
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	23.50 to 24.00
Old steel car axles	17.00 to 17.50
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	13.00 to 13.50
No. 1 yard wrought, short	12.00 to 12.50
Light iron	5.00 to 5.50
Cast borings	6.50 to 7.00
Wrought turnings	6.50 to 7.00
Wrought pipe	11.00 to 11.50
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	12.50 to 13.00
Stove plate	9.50 to 10.00
Locomotive grate bars	9.50 to 10.00
Malleable cast	11.50 to 12.00

Metal Market

NEW YORK, March 8, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead.		Spelter.	
March.	Lake.	Electrolytic.	Tin. New York.	New York.	St. Louis.	New York.	St. Louis.
2	12.75	12.37½	41.70	4.40	4.25	5.65	5.50
3	12.75	12.37½	41.10	4.40	4.25	5.65	5.50
4	12.62½	12.25	....	4.40	4.25	5.65	5.50
6	12.62½	12.25	40.00	4.40	4.25	5.65	5.50
7	12.62½	12.25	40.00 40.25	4.40	4.25	5.65	5.50
8	12.62½	12.25	41.75	4.40	4.25	5.65	5.50

Premiums are still demanded on tin for spot delivery, although the price is lower than a week ago. Copper is lower. Spelter is softer, but prices are largely nominal. Antimony continues high, although consumers are uninterested.

Copper.—Copper prices have fallen off, but sellers do not seem anxious to do business at prevailing quotations. At least three important selling interests in New York refused to make quotations yesterday and to-day, apparently awaiting the figures of the Copper Producers' report which came out this afternoon, showing an increase in stocks of 14,198,280 lb. from February 1 to March 1. Good sales were made on Saturday and Monday at lower prices than were asked last week, and some consumers appeared anxious this morning to place orders for lake copper which in many quarters was quoted at 12.50c., although it could not be discovered that actual offers to sell were made at less than 12.62½c. Lake copper appears to be relatively stronger than electrolytic, which has been offered freely for spot delivery at 12,25c. Some good sales of electrolytic were made for delivery in the Naugatuck Valley, 30 days cash, at 12.37½c. In London to-day the market closed firm with spot copper selling at £54 17s. 6d. and futures at £53 11s. 3d. The sales amounted to 400 tons of spot and 600 tons of futures. Exports of copper so far this month amounted to 5693 tons.

Waterbury Average.—The Waterbury average for February was 12.75c. The average price of lake copper in New York for the month was 12.75c., and the average price of electrolytic copper was 12.37½c.

Pig Tin.—A good business could have been done in pig tin during the week if New York prices for spot delivery were equal to the London quotations, but available stocks are so scarce here that holders of the metal are demanding substantial premiums. To many consumers the lower price quoted in London looked tempting and they offered to buy here at a corresponding figure. Supplies were so scant, however, tha those who had tin to sell refused to consider the offers, and only those who had to have some for immediate use made purchases. On Monday spot tin was selling at 39.70c., and tin on the steamer Mesaba, due to-day, was sold at the same price. Yesterday spot tin went as high as 40.25c., while Mesaba tin could be had for 39.25c. A price corresponding to that asked on board the steamer was demanded for March delivery. Judging from inquiries, stocks in consumers' hands in the East are very scarce, but if the London market continues to decline it is thought that some consumers who are heavily stocked in other sections of the country will offer part of their holdings for resale. It is believed that the London syndicate is unloading, but the operators there have not lost control of the situation, by any means. Pig tin for spot delivery was sold in New York this afternoon for 41.75c., and tin on board the steamer Mesaba was offered at 40.75c. The London market closed strong to-day, with spot tin selling at £183 10s. and futures at £183. The sales amounted to 200 tons of spot and 600 tons of futures.

Tin Plates.—The demand for tin plates is steadily on the increase. Some good business has been done in this market with manufacturers of household tinware and can manufacturers who are specifying freely for stocks required for delivery this spring. The quotation on 100-lb. coke plates remains unchanged at $3.94, New York. Although quotations on foreign tin plates have fallen off slightly, present prices seem somewhat prohibitive, and there is little demand.

Lead.—The lead situation is decidedly unsatisfactory to consumers. Because of the lack of statistics regarding supplies and stocks, the trade is unable to ascertain the real position of the metal. Outside sellers are shading prices and underselling the leading interest in the New York market. A great many consumers who regularly buy from the principal producer have been holding off with the idea that its quotations would be reduced to meet the price made by outside sellers, but they seem to be unable to get information as to its future policy in that respect. Many consumers seem to think that it is to their advantage to remain loyal to their usual source of supply, but some of them have been obliged to act and have placed good-sized orders during the week with independent sellers. It is known that shipments of lead ore from the Joplin district have been especially heavy of late, but there is no way of getting at the actual production figures. Outside sellers are offering lead freely in the New York market at 4.40c. and the St. Louis market is weak with lead selling at 4.25c.

Spelter.—Spelter receded slightly during the week, but the market is fairly strong. Sellers are stiff in their demands, and many of them show a disposition to ignore inquiries, as they are predicting that prices will advance. It is hard to gauge the situation. Some New York houses are in recent private information to the effect that quotations have been shaded under 5.50c., St. Louis, which is the price generally asked for prompt shipment to the East. There is so little spelter in New York that some dealers are asking premiums over the usual quotation of 5.65c.

Antimony.—Regardless of the recent excited trading among dealers in antimony, the consumers continue to ignore the market. Actual confirmation of the reports of the formation of a syndicate of foreign makers of antimony is lacking, and some of those who bought heavily during the

THE IRON AND METAL MARKETS

flurry of 10 days ago are now wondering whether they acted wisely. It is said that the tip regarding the proposed syndicate got out before the makers of Chinese antimony had been approached in the deal, and while attempts have been made by interested parties to find out where those makers stand they have been unsuccessful. The following prices are largely nominal: Cookson's, 9.50c.; Hallett's, 9.25c.; Chinese, 8.27½c.; Hungarian grades, 9c. Some sellers are offering Chinese and Hungarian grades for delivery in April and May at 8.80c.

Old Metals.—The market is weak in sympathy with new ingot copper. Prices are nominally unchanged, but would no doubt be shaded if necessary to effect business. Selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible	11.75 to 12.25
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Clean brass turnings	7.75 to 8.00
Composition turnings	8.75 to 9.00
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Metals, St. Louis, March 6.—Lead is quiet at 4.25c.; spelter is firm at 5.50c. to 5.55c., both at East St. Louis. Zinc ore is firm at $39 to $41 per ton, Joplin, base. Tin is quoted at 40.60c.; antimony (Cookson's) is sharply higher at 9.85c.; lake copper unchanged at 13.10c.; electrolytic also unchanged at 12.85c., all at St. Louis. The demand for finished metals the past week was fairly good.

L. Vogelstein & Co., 42 Broadway, New York, furnish the following figures of German consumption of foreign copper in January, 1911: Imports, 13,329 tons, of which 11,714 tons came from the United States; exports, 639 tons; apparent consumption, 12,690 tons, as compared with apparent consumption of 14,750 tons in January, 1910.

Iron and Industrial Stocks

NEW YORK, March 8, 1911.

Security values have sagged somewhat under the shadow of the approaching extra session of Congress, which may have an unsettling influence on general business. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref.	30½ - 31	Railway Spr., com.	33 - 35
Beth. Steel, com.	30 - 31¼	Railway Spr., pref.	99¼
Beth. Steel, pref.	60½ - 61¾	Republic, com.	32 - 33½
Can. com.	9½ - 10⅛	Republic, pref.	98½ - 99¼
Can. pref.	85⅝ - 82	Sloss, com.	52⅛ - 53½
Car & Fdry, com.	52½ - 54	Pipe, com.	18
Car & Fdry, pref.	118	Pipe, pref.	58 - 58¾
Steel Foundries.	45⅞ - 48	U. S. Steel, com.	74⅝ - 77¾*
Colorado Fuel	31 - 33	U. S. Steel, pref.	118 -119
General Electric	147 -149¼*	Westinghouse Elec.	67 - 70½
Gr. N. ore cert.	58 -59¼*	Va. I., C. & C.	60½
Int. Harv., com.	116 -117	Am. Ship, com.	76 - 77
Int. Harv., pref.	123 -124	Chi. Pneu. Tool	51 - 54½
Int. Pump, com.	39½ - 41⅞	Cambria Steel	46¾ - 47¾
Int. Pump, pref.	87½ - 88¾	Lake Sup. Corp.	30 - 30½
Locomotive, com.	36¼ - 39	Pa. Steel, pref.	106 -106½
Locomotive, pref.	109½-110¾	Warwick	11
Nat. En. & St., com.	17 - 18	Crucible St., com.	13⅜ - 14½
Pressed St., com.	31¾ - 33	Crucible St., pref.	79¾ - 81
Pressed St., pref.	97 - 97½	Harb.-W. Ref., com.	41

* Ex dividend.

Dividends.—The Youngstown Sheet & Tube Company has declared the regular quarterly dividend of 2 per cent.

The American Can Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable April 1.

Notes on Prices

Rope.—Under aggressive competition, owing to the limited demand for rope, prices of Manila cordage have dropped off ¼c. per pound, and as a consequence sisal products are generally quoted at a like reduction in price. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8½c. to 9c. per pound; second grade Manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6¼c. per pound.

Linseed Oil.—Prices have been hammered down 1c. per gallon as the result of large buyers testing the market and the lack of demand, but no large amount of business has developed at the lower price. For carload lots of domestic oil 94c. per gallon is quoted. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	
State, raw	95
City, raw	95

Naval Stores.—The demand for turpentine continues moderate, as manufacturing consumers show little interest and are buying in jobbing lots. While receipts have been light at Southern points, they have been enough to supply requirements. New York quotations on turpentine in five-barrel lots are as follows:

	Cents.
In oil barrels	91
In machine barrels	91½
Less than 5-bbl. lots, ½ cent advance per gallon.	

Rosins are moving slowly, in about the same volume as for the past two weeks. On the basis of 280 lb. to the barrel, common to good strained is quoted at $7.45 and grade D at $7.70 in the New York market.

Tonnage of the Bessemer Railroad

The following table shows the tonnage of the Bessemer & Lake Erie Railroad, which is owned by the Carnegie Steel Company, and extends from Conneaut Harbor, on Lake Erie, to a connection with the Union Railroad, the industrial road of the company, distributing ore to the Edgar Thomson, Duquesne and Carrie furnaces, a total of 24 stacks:

	Iron ore.		Other freight.	Total.
	Gross tons.	Net tons.	Net tons.	Net tons.
1897	440,810	500,428	650,928	1,151,356
1898	1,477,768	1,655,101	812,273	2,467,374
1899	2,176,525	2,437,708	1,054,455	3,492,163
1900	2,396,474	2,684,051	1,496,340	4,180,391
1901	3,233,962	3,622,038	1,803,316	5,425,354
1902	4,183,868	4,685,933	1,993,435	6,679,368
1903	3,909,982	4,379,180	2,507,317	6,886,497
1904	4,087,675	4,578,196	2,629,233	7,207,429
1905	5,196,668	5,820,268	9,685,171	9,505,439
1906	5,316,338	5,820,268	3,685,171	9,505,439
1907	5,843,186	6,544,369	4,790,992	11,335,361
1908	4,715,023	5,280,825	4,077,141	9,357,966
1909	6,745,802	7,555,298	5,034,741	12,590,039
1910	6,441,336	7,214,296	6,191,105	13,405,401

A committee of the New Jersey Senate held a hearing at Trenton on Tuesday to consider the proposition to appropriate about $500,000 to purchase the right of way for the proposed ship canal from Newark Bay to the Delaware River. Notable waterway advocates were present from other States to speak in favor of the project. It is considered a most important link in the proposed coast canal from Massachusetts to Florida. There were no speakers in opposition.

The Mimmack Foundry Company has purchased what was left of the Wolverine Foundry Company, and is intending to carry on a general foundry business at 936 Bellevue avenue, Detroit, Mich., manufacturing fine gray iron castings, stove and furnace repairs, plumbers' supplies, hardware specialties, &c. J. M. Weidinger is president, A. R. Mimmack, vice-president and manager, and W. Kulewatz, secretary and treasurer.

The annual meeting of the New York Metal Exchange will be held at the board rooms, 111 Broadway, on Wednesday, March 15, when the reports of the Board of Managers and the treasurer will be acted upon. The election of the officers and managers to serve during the ensuing year will take place on Monday, April 3.

The officials of the Crucible Steel Company of America, Pittsburgh, made an inspection trip last week to the plant of the Midland Steel Company, Midland, Pa., which their company took over on March 1.

The United States Treasury deficit to March 7 for this fiscal year is $4,413,074, as against $23,314,654 at the same time last year. These figures exclude Panama Canal and public debt transactions.

Personal

C. W. Gennett, Jr., head of the rail department inspection for Robert W. Hunt & Co., Chicago, has just returned to Chicago from an extensive trip through Mexico. While in that country he spent some time at the plant of the Monterey Iron & Steel Company, Monterey, Mexico. His stay there completed a record of inspection in every rail mill on the North American continent.

Announcement is made that Fred Collins is now connected with the Dearborn Drug & Chemical Works, with offices at 299 Broadway, New York.

A. C. Scherer, of Robert W. Hunt & Co., has succeeded C. A. Hanson as permanent rail inspector at the plant of the Monterey Iron & Steel Company, Monterey, Mexico, the Chicago firm having the rail inspection contract for the National Railways of Mexico.

H. B. Van Pelt, who has been connected for the past 10 years with the Standard Tool Company, Cleveland, Ohio, as purchasing agent and for part of the time in charge of the advertising department, has resigned, to take effect March 11. He has taken the position of manager of the Cleveland sales office of the Pittsburgh Shafting Company, Detroit, Mich.

E. M. Sutliff, chief engineer and director of the American Trading Company, 25 Broad street, New York, has returned from a business trip to China and Japan.

Knut W. Bildt, mechanical and electrical engineer, in charge of the works of the Luossavaara-Kiirunavaara Mining Company, Kiruna, Sweden, and chief engineer of the Gellivaara Company's mines in Sweden, and Fredrik Jonson and Tosten Holmgren, royal engineers of Sweden, connected with the Government Board of Water Power, are now in this country. They were the guests of the Ingersoll-Rand Company for a few days, before starting on a tour which may extend to Seattle, in the course of which they will collect data which will be of use to them in the extensive water works development which the Swedish Government has under way in Lapland.

Wallace Buell, who has been connected with Abendroth Brothers, Port Chester, N. Y., as general manager, has severed his connection with that company. He is succeeded by John Mason Ellis, who is to act in the capacity of comptroller.

R. C. Yates, formerly sales manager for the Bethlehem Steel Company in the Chicago district, has identified himself with the Union Drop Forge Company, Chicago, as sales manager.

John Mitchell, formerly president of the United Mine Workers of America, has tendered his resignation as chairman of the trade agreement department of the National Civic Federation, to take effect March 31. An authorized statement says that the United Mine Workers asked Mr. Mitchell to withdraw from the Civic Federation or give up his membership in their organization.

L. F. Walter of the firm of Walter-Wallingford & Co., Cincinnati, has left for a two months' pleasure trip to California and the West.

A. P. Gowen has resigned as purchasing agent of the Republic Iron & Steel Company, Pittsburgh, to become director of purchases of the Pullman Company, effective March 1. C. I. Starrett has been appointed acting purchasing agent of the Republic Iron & Steel Company.

Carl Falk, late sales manager for the Harman Pneumatic Machine Company, has become the Buffalo representative of the Mumford Molding Machine Company, 30 Church street, New York, beginning March 1. He is now located in Buffalo.

Harvey De T. Kramer has become associated with Liveright Brothers, manufacturers of Gold Medal files, Philadelphia, Pa., as direct factory representative in the Philadelphia territory. He was formerly connected with Powell Clouds & Co. and Henry Disston & Sons, Inc.

James W. Keffer has been appointed manager of the Shelby Iron Company, Shelby, Ala., succeeding J. H. Walker, resigned.

The Tariff Board, as it now stands, is constituted as follows: Henry W. Emery, Alvin H. Sanders, Wm. M. Howard, James B. Reynolds and Thomas W. Page. Messrs. Howard and Page are Democrats, the former being a former Georgia Congressman and the latter a professor of economics at the University of Virginia.

Frank J. Krouse, who has been connected with the Cambria Steel Company, Philadelphia, Pa., for the past 15 years, and recently chief clerk in the sales department in that office, has been appointed assistant sales agent in the Philadelphia territory, succeeding the late M. C. Edwards.

Robert L. Windholz, who has for several years been vice-president of the Vandyck Churchill Company, has resigned from that company and will shortly open an office in New York City, acting as special Eastern representative for several prominent machine tool manufacturers. His temporary address is room 1558, 50 Church street, New York City.

Frank B. Baird, president of the Buffalo Union Furnace Company, Buffalo, N. Y., returns this week on the Adriatic from a two months' trip to the Mediterranean and the Nile. His route back was through France and England.

Obituary

JOHN CORRIGAN, at one time largely interested in lake vessel companies in Cleveland, was killed in an automobile accident in Los Angeles, Cal., March 1, aged 65 years. He was a brother of the late James Corrigan of Corrigan, McKinney & Co., and was at one time president and treasurer of the Aurania Transit Company, vice-president of the American Transit Company and a director of the Lake County Transportation Company. Since his retirement from business in Cleveland he had been living on a farm at Perry, Ohio.

FREDERICK K. MAUS, Chicago, through grief over the death of his wife, which happened five years ago, committed suicide March 1, with a pistol shot. He was born at Belleville, Ill., in 1846, and received his early education in the public schools of St. Louis. Later he attended the United States Naval Academy and served as midshipman during the last two years of the Civil War. He left the navy in 1864 and engaged in business in St. Joseph, Mo., where he entered the firm of D. A. Constable & Co., iron and steel merchants. Some 10 years afterward he severed that connection, becoming identified with the firm of Robinson & Maus. In 1879 Mr. Maus and David Kelley founded the firm of Kelley, Maus & Co., Chicago, which for a long time conducted a large business in jobbing iron, steel and heavy hardware. Two years ago he became a director of the Scully Steel & Iron Company when that concern absorbed Kelley, Maus & Co.

WILLIAM AVERY GRIPPIN, president of the Bridgeport Malleable Iron Company, Bridgeport, Conn., died March 1 at Grand Canyon, Ariz., aged 60 years. He was born in Corinth, N. Y., and worked his way up in the foundry business, which he entered as a boy. He leaves a widow.

Gasoline Engine Speed Regulator.—The Cedar Rapids Foundry & Machine Company, 841 Second avenue, West, Cedar Rapids, Iowa, has placed on the market a speed regulator designed especially for use in operating cream separators and other machinery of this nature with gasoline engines. Shafting of various lengths can be furnished, mounted on a platform with the necessary pulleys for driving a number of machines. This platform is fastened to the ceiling, wall or floor, as may be desired, and gives a self-contained variable speed line of shafting. The variation in the speed is secured while the governor is in motion by giving the small wheel one or two turns. It is also possible to stop or start the machinery while the engine is running at full speed.

A Canadian Associated Press dispatch quotes the chairman of Bilton's, Ltd., Birmingham, England, as saying at the annual meeting held a few days ago that the company's trade with Canada had been greatly increased by the British preference.

Industrial Safety

A Movement to Secure Wider Use of Safety Appliances in Factories

Under the auspices of the Industrial Safety Association, David Williams, former president of the David Williams Company, entertained representatives of the technical press at a dinner at the Engineers' Club, New York, on the evening of March 1. On this occasion the purposes of this association were explained. Mr. Williams addressed those present from the standpoint of a man who had spent a large part of his life in the field of technical journalism and is therefore still deeply interested in movements in which the technical press may properly use its influence for the general welfare. He also spoke as a large employer of labor, being the owner of a publishing establishment having a force of several hundred work people. His remarks were well calculated to excite interest in the subsequent proceedings.

Prof. F. R. Hutton delivered a fascinating address on the use of safety appliances in factories, illustrated by a large number of lantern slides, showing appliances used in manufacturing establishments in Europe and in this country. These illustrations showed the increasing attention which is being given to the introduction of devices for the safety of workmen. They also included descriptions of methods employed for securing greater safety in the danger zone of factories generally, as well as in the yards or grounds in their immediate vicinity, and the facilities introduced into many large works for the care of employees meeting with accidents or seized with sudden illness. Henry R. Towne, president of the Yale & Towne Mfg. Company, stated that, as showing the important function exercised by an emergency hospital, the well-equipped hospital at the company's works at Stamford, Conn., had in the past year administered 14,000 treatments to members of a force comprising 3000 work people. It is a rule of his company that those suffering even from slight injuries shall immediately report to the hospital for treatment. The cases were not all accidents but included a large number of instances of illness arising from causes apart from those incidental to employment in the factory.

The American Museum of Safety

At the conclusion of the addresses, those present were taken to the rooms of the American Museum of Safety in the adjoining United Engineering Building, where they were given an opportunity to inspect the large collection of safety and sanitary appliances now to be found there. Dr. William H. Tolman, director of the museum, took much pleasure in describing the various appliances and in giving some interesting incidents showing the attention which the subject of introducing safety devices is now receiving among large employers of labor. Representatives of important manufacturing establishments have spent days at a time in examining and making note of these devices for the purpose of making practical use of them.

Dr. Tolman has prepared a large number of lantern slides which are available at a very moderate price for superintendents or others in charge of industrial establishments who may desire to deliver illustrated lectures to their employees for the purpose of impressing upon them the necessity of using such safety devices when installed. He has also under preparation photographs for use in the same way, showing improved safety devices adapted to machines involving some danger in their operation. This work is constantly being extended for the purpose of more thoroughly educating employers and employees in this direction. Dr. Tolman has devoted the past 10 years to this work, which he is untiringly pursuing in the interests of true philanthropy.

The Industrial Safety Association

For the purpose of securing permanent financial support for this movement, including the maintenance of the American Museum of Safety, the Industrial Safety Association has been formed. As Professor Hutton stated in his address, it is the useful function of somebody to standardize shop rules so that a man will not have to learn over again a new set of rules when he changes his place of employment; a reduction in the number of accidents will naturally be the consequence. It is therefore believed that a separate body can be of much more service in doing this than the engineering societies, which are now conducting such useful work in their respective fields of endeavor. The Industrial Safety Association will undoubtedly draw much of its support from the members of the various engineering societies and those who are interested in the particular branches of industry they cover.

The objects of the association, as stated in its constitution, are as follows: "To prevent accidents to life, limb or body of persons engaged in productive industry, or in the occupations contributory thereto in which mechanical or other sources of power are employed; and to promote the health and well-being of persons engaged in the wage-earning processes and other occupations of life, by disseminating knowledge of sanitation and hygiene. These objects shall be sought by the association through the gathering together of knowledge on these subjects and by its distribution among the members and the public generally, by means of publications, lectures, and other educational processes." Its methods shall "consist in collecting models, photographs, illustrations and examples of safety devices and apparatus designed to prevent or lessen accidents in industrial and other occupations; in collecting literature and other information on the subjects of accidents and industrial hygiene and the maintenance of a library for free public references on these topics; the conduct of research work and investigations into the effectiveness and improvements of safety apparatus; the maintenance and support of collections of such safety devices and their exhibitions in museums in New York and other cities as may from time to time seem desirable; and the conduct in every way of diminishing accidents and promoting better sanitation and hygiene."

The Officers and Some Other Details

The officers of this association, for the first year, are: President, F. R. Hutton, consulting engineer Department of Water, Gas and Electricity, New York City. Vice-Presidents, T. Commerford Martin, secretary National Electric Light Association; Charles Kirchhoff, president American Institute of Mining Engineers; Henry R. Towne, president Yale & Towne Mfg. Company. Managers: Philip T. Dodge, president Mergenthaler Linotype Company; Frank E. Law, vice-president Fidelity and Casualty Company; Arthur Williams, electrical engineer New York Edison Company; Ira H. Woolson, consulting engineer National Board of Fire Underwriters. Treasurer, Robert A. Franks, president Home Trust Company. Secretary, William J. Moran, counsel. A good list of members has already been secured, so that an excellent start has been made.

The association invites participation in its work by all engineers, on the philosophy of the national bodies already at work, each in its own field. A small annual due, $10, from a large number of members will make it possible to do great things. The association has further arranged for corporate memberships and will be glad to work with labor unions also in the furtherance of safeguarding their members. Contributing members paying $100 a year may command an illustrated lecture on safety in their own plant every year by one of the experts attached to the association.

The association will issue, as its principal agency for carrying these ideas into practical effect, a monthly to be known as the *Journal of Industrial Safety*, which is to present illustrations of designs of safety apparatus and do general educational work in hygiene and sanitation for factories. The first issue of this journal, for February, 1911, was laid before those who participated in the banquet. This issue consists of 20 pages. Its contents comprise a salutatory by Prof. F. R. Hutton; "Safety Attachment for Valves on Steam or Acid Mains"; "Safety Attachment for Repair and Inspection Ladders"; "Safety Attachment for Crane or Hoisting Hooks"; "Safety Grabs for Handling Metal Plate";

"Safety Pinch Bar," &c. Professor Hutton invites articles descriptive of new appliances or devices for securing the safety of workmen.

The movement which has thus been inaugurated is one which must appeal to all those who are interested in the welfare of their fellow men. It is essential that some organization should conduct a work of this kind, which is beyond the ability of any one individual. The purpose is eminently benevolent and the influence of the new association should be far-reaching.

The Philadelphia Foundrymen's Association

Address by James M. Dodge

The fact that James M. Dodge, chairman of the Link-Belt Company, Nicetown, Philadelphia, was to address the Philadelphia Foundrymen's Association, at its regular monthly meeting at the Manufacturers' Club in that city, on the evening of March 1, on "Conservation of Human Effort as Applied to the Scientific Management of the Office and Shop," brought out the largest gathering of foundrymen, both local and out of the city, that has attended the association meetings for a long time, over 70 being present. President Thomas Devlin occupied the chair and after routine business had been transacted appropriate resolutions were adopted on the deaths of H. W. Coleman, of J. K. Dimmick & Co., and Charles Nicholson, of the Carborundum Company. A formal invitation to attend the annual convention of the American Foundrymen's Association, to be held in Pittsburgh, Pa., May 22 to 27, was read by the secretary, and plans will be made for a representative attendance from Philadelphia. Mr. Dodge was then introduced and said, in part:

Mr. Dodge's Address

"Scientific management, so called, was launched on the manufacturing world by Fred W. Taylor, of Philadelphia, in a paper called 'Shop Management,' presented before the American Society of Mechanical Engineers, in which he summed up experience and information gathered from various sources during a period of 25 years. The system outlined became known as the Taylor system, and later was spoken of as scientific management, but I consider the proper name for the subject as 'Conservation of Human Effort by Scientific Management.'

"The Link-Belt Company decided upon the introduction of the Taylor system before the publication of Mr. Taylor's paper, previously referred to, and, I believe, was the first manufacturing concern to introduce the system in its entirety, in its different plants. The reason of its adoption was largely based on the fact that I had been acquainted with Mr. Taylor and his development of high-speed steel cutting tools at the Bethlehem Steel Company, which led to the adoption of the use of these tools at the Link-Belt plant. Incident to the increased production with these tools, then only adaptable for cutting steel and later developed for equally satisfactory work in gray iron, it became necessary to arrive at a new basis of payment for work done, realizing that the old methods of piece rate prices were at best but a guess of more or less accuracy, and to increase the pay on the basis of the productive rate would simply be multiplying the error.

"No past experience was available under the new conditions, and it was only by long and painstaking work, running over several years, that a system was reached, the accuracy of which could not be questioned. In all this work of development Mr. Taylor aided with his knowledge and experience. At times it was extremely difficult to get our mechanics accustomed to the new order of things; everything had to be changed, some things eliminated and other methods substituted. The policy that 'a rate once set must not be reduced unless the shape of the piece be changed, or the tool by which it is made, or the method by which it is made, and, that a man must be paid when he did his work without a quibble,' was a hard dose to swallow but after a while, we got so that we were complaisant when a man made twice or three times the wages he had been perfectly satisfied to work for, if we had hired him by the day. The system gradually developed a new relationship between the employer and the employee, based on set rates; friction was eliminated and a man's time was not bartered for, but rather his product. In fact, the employee himself became the petty manufacturer.

"The application of this system has, after careful and exhaustive study, been carried to every department of our plants; it is a cost system intensified, and the data for basing estimates of cost and selling prices are practically immediately available. Under the new system of scientific shop management, it is the employer's aim to search out and help the laggard in the ranks; to aid him in obtaining the proficiency of those in the front ranks and become an active producer for the good of all. While I speak from the standpoint of one who has helped to build up this scientific system in my own plants, I would state that it is fully applicable to the conduct of all lines of business. The old idea of doing business has been given a tremendous set back by the adoption of scientific methods and the opportunity to acquire knowledge and education, which are the important factors in today's business affairs."

Mr. Dodge was given a unanimous vote of thanks for his most interesting address.

The Producers' Coke Company

With an annual output of more than 1,000,000 tons of the very best Connellsville coke available, the Producers' Coke Company, Uniontown, Pa., recently incorporated, commences business auspiciously. The new corporation will be the selling agency for six or eight producing companies. As the organization matures and its plans evolve, the productions of other companies will be accepted and marketed by the company.

This corporation is not to be confused with the much discussed central selling agency of the operators. Its capitalization is held entirely by the five gentlemen who constitute the board of directors. It will not undertake to handle the productions of all the independents, but only of those as it will be enabled to supply with regular business. It has been capitalized at $50,000, and the following are the directors: J. W. Abraham, F. E. Peabody, H. W. Semans, J. E. Hustead, all of Uniontown, and R. W. Gilmore, of Dunbar. Mr. Abraham is president; Mr. Peabody, vice-president and general manager, and Mr. Semans, secretary and treasurer.

The company has a strikingly substantial personnel, which bespeaks success and prosperity for it. The president, Mr. Abraham, is one of I. W. Semans's partners in a number of coke companies, being president and general manager of the South Fayette Coke Company, and occupying positions of responsibility with several other producing companies.

Coke Ovens at Lorain, Ohio.—The statement was made in a recent newspaper dispatch that a large plant of by-product coke ovens will be built in the near future at the Lorain, Ohio, plant of the National Tube Company. It has been understood for some time that the Lorain and Cleveland groups of blast furnaces would eventually be supplied with coke from by-product ovens built alongside, but no plans have been made for such plants, nor have any appropriations been passed.

At the annual meeting of stockholders of the Drigg-Seabury Ordnance Corporation, recently held in Sharon, Pa., the various reports submitted showed that its business has recently improved very materially. More orders were received in February than during the three preceding months. The board of directors was re-elected and also the officers, the latter being John Stevenson, Jr., president; C. W. Blackman, secretary and F. E. Gross, treasurer.

The Keystone Bronze Company, Pittsburgh, Pa., has increased its capital stock from $5000 to $250,000.

Metal Trades Annual Meetings

Cleveland Branch

The annual meeting and banquet of the Cleveland, Ohio, Branch of the National Metal Trades Association took place at the Hollenden Hotel in that city March 2. The meeting, which was an unusually interesting one, was attended by about 70 leading manufacturers. Harmony between the employer and employee and the workingmen's compensation bill now pending before the Ohio Legislature were the principal subjects of discussion.

In his annual report President Bartlett referred to the friendly relations existing between manufacturers and their employees in Cleveland. Other speakers were Hon. W. T. Smith, Marion, Ohio, a member of the Ohio Legislature; Ernest Ludwig, consul for Austro-Hungary in Cleveland; J. P. Smith, a member of the Ohio Employers' Liability Commission, and Dr. W. A. Knowlton of Cleveland. Mr. Ludwig objected to a provision in the proposed law that allows only one-half the amount of the regular compensation for death in the case of an alien whose dependents are living in the old country. Attention was called to the fact that labor organizations and liability insurance companies are maintaining lobbies at Columbus to fight the proposed law and it was decided to send a delegation to appear before the legislative committees in behalf of the bill. W. D. Sayle, Cleveland Punch & Shear Works, acted as toastmaster at the banquet.

C. O. Bartlett, C. O. Bartlett & Snow Company, was re-elected president and Fred H. White, Baker Motor Vehicle Company, was re-elected vice-president. Other officers were elected as follows: Treasurer, James H. Foster, Hydraulic Pressed Steel Company; Executive Committee: J. H. Champ, Bishop & Babcock Company; J. C. Sparrow, National Safe & Lock Company; W. A. Comstock, Cleveland Wire Spring Company; C. B. Wilson, Ferro Machine & Foundry Company, and Fred Metcalf, Chase Machine Company.

Boston Branch

The Boston Branch elected these officers at the annual meeting, held at Boston, March 1: President, Winslow Blanchard, Blanchard Machine Company, Cambridge; vice-president, H. I. Illingworth, Boston Machine Works Company, Lynn; treasurer, Duncan D. Russell, James Russell Boiler Works, South Boston; executive committee, to serve to 1913, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge, and W. S. Martin, Mead-Morrison Mfg. Company, Cambridge, together with E. P. Robinson, Atlantic Works, East Boston, as an honorary member.

Cincinnati Branch

The annual meeting of the Cincinnati Branch was held at the Business Men's Club, Cincinnati, March 2. Secretary J. M. Manley had arranged a sumptuous banquet, which was very much enjoyed by the local members and their friends, as well as the following out-of-town guests: Ed. Knauss, H. J. Coleman, W. C. Carter, R. K. Leonard, George O'Connor, Charles E. Fink, William Ganshow, Gus. Kuehn, A. Moore, J. A. Scully, W. B. Lewis, O. A. Olsen, H. J. Starke, Thomas Wagstaff, J. D. Wiggins, E. H. Wachs, Jr., Paul Blatchford, Alfred Marshall, John Blatchford, S. J. Moran, C. E. Hoyt, C. E. DePuy, Herbert Cobb, F. K. Copeland, R. E. Gould, Anton Skofsrud, Tom. Vaughan and J. L. Wagner, all of Chicago; H. S. Buttenheim of *The Iron Age*, New York; H. P. Eels, Cleveland; W. A. Layman, St. Louis; D. C. Buell, Omaha; H. H. Rice, Indianapolis; W. H. Vandervoort, Moline, Ill., and M. Cokeley, Lima, Ohio.

Following the banquet, the annual election was held and Henry Ritter, Lunkenheimer Company, was chosen president to succeed R. K. LeBlond. P. O. Geier was elected vice-president, E. Von Wyck, treasurer, and George W. Knapp, secretary. The new executive committee is composed of George McG. Morris, J. C. Hobart and W. J. Friedlander.

Among those called on for toasts, after the regular business matters had been disposed of, were the following: President J. H. Schwacke, of the National Metal Trades Association; John Uri Lloyd, D. C. Buell, H. H. Rice, W. H. Vandervoort, William Ganshow, Franklin Alter, William Lodge and Fred A. Geier.

On March 3 the visitors were taken to the different machine tool plants in Cincinnati, including those in Oakley. Some time was also spent in the University of Cincinnati and in the Continuation School, as guests, respectively, of Profs. Hermann Schneider and J. H. Renshaw. In the evening a beefsteak dinner was served at Wiedemann's in Newport.

Two New Metals

At the Motor Boat Show held in New York City recently two new metals were exhibited. One of these, which has copper and aluminum as its base and is known as Cupror, is being marketed by the Cupror Company, 50 Church street, New York City. This new metal is not corrodible and will not oxidize, and its luster, which is higher than that of any other metal, is permanent. Sea water and salt air have no effect upon the metal, and it is not affected by acids. Its color is that of 18 carat gold, and when examined with the microscope its texture is exactly like that metal, while its specific gravity is 8.11 as compared with 19.36 for gold. Any discoloration due to the weather can be removed quite easily by merely rubbing or washing with soap and water. This metal can be furnished in sheets of any gauge and width and desired degree of hardness, tubing, castings, ingots, wire as fine as 0.00175 in. in diameter and rods. Some of the important uses for the metal are the manufacture of jewelry, table ware, lamps, ornaments, signs, automobile, boat and furniture trimmings and watch chains. In casting Cupror borax is used as a flux, and the temperature required is from 2200 to 2400 degrees F. The pouring must be made as quickly as possible after this temperature is reached and an ample gate provided for shrinkage. In working the sheet metal with tools the fact must be borne in mind that this hardens and stiffens the metal considerably, thus enabling a thinner gauge to be employed. Tests made on Cupror wire showed a tensile strength of 138,550 lb. for spring wire and 125,540 lb. for soft wire, while round test bars gave results of from 59,570 to 93,100 lb. square inch.

The other metal, Hardened Copper, was exhibited by the Dawson Hardened Copper Company, 123 Liberty street, New York City. This metal contains 80 per cent. of copper, the remainder being tin with very minute traces of two other elements. This metal can be used for a number of different kinds of work, and is capable of taking a keen edge. One of its special uses is the manufacture of fish knives, as it is not affected by the action of sea water. It is claimed that this metal can be recast an unlimited number of times without any change whatsoever, and when the metal is first made there is no loss by oxidation. In making castings from the metal or in making the metal itself, the mechanical operations do not materially differ from those in making ordinary bronze or brass castings. The tensile strength of this metal is 37,500 lb. per square inch.

The cost of power generation will be the topic for discussion at a meeting of the American Society of Mechanical Engineers co-operating with the American Institute of Electrical Engineers on the evening of March 10 at the United Engineering Societies Building, 29 West Thirty-ninth street, New York. In view of the fact that New York City contains the largest collection of steam plants in the world, with close competition between the central stations and isolated plants, this promises to be a most interesting and important meeting. It will be of interest to every owner of large buildings, hotels and shops.

The Anderson Engine Company, manufacturer of gas and gasoline engines, Shelbyville, Ill., has sold to the Ketler-Elliott Erection Company, Chicago, a 50-hp. two-cylinder Anderson marine engine for operating an air compressor to be used in connection with bridge construction, &c.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

International Association for Testing Materials

The current number of the *Proceedings* of the International Association for Testing Materials gives a report of the meeting of the Council of the association held at Brussels, August 13, 1910, at which President Henry M. Howe presided. Professor Howe brought up the matter of stamping the specifications for structural and other steel sold in international markets. He said that the Executive Committee of the American Society for Testing Materials had recommended the following form of stamp for such specifications:

Certified by the International Association for Testing Materials as Standard Specifications for (designation of material) Manufactured in (name of country).

In Professor Howe's opinion the general "recommendation" of the standard specifications of the various countries for export orders as drawn up at the last Council meeting was not so good as the simple certifications as standard specifications of the countries in question. The stamp should do more than to say that the specifications in question were drawn up, for example, by the American Society for Testing Materials. It should certify that the American Society, drawing up these specifications, is really a trustworthy one.

It was stated by George C. Lloyd, representing Great Britain, that the British members of Committee 1a intended to recommend the standard specifications of the three national societies for use in the respective countries for export orders, as distinct from the specifications prepared by other bodies or individuals in those countries. The Council passed the following resolution:

The Council sees no formal objection to the suggested modification of the text as to stamping proposed by the Executive Committee of the American Society for Testing Materials, in case Committee 1a wishes to adopt it.

It was decided to appoint a special subcommittee of Committee 1a for cast iron in order to put forward the work of that committee.

A resolution was passed, as presented by Professor Howe, to the effect that the universal adoption of the metric system would greatly facilitate progress in the unification of specifications for materials of construction. Government authorities and the learned and industrial bodies in all countries in which the metric system is not yet obligatory are urged in the resolution to promote its early adoption. The resolution will be distributed to all Government authorities and appropriate bodies of Great Britain, North America and Australia.

For the Sixth Congress, which will be held in New York in 1912, the following are published as the principal questions and the technical problems which will be presented so far as relates to metals:

PRINCIPAL QUESTIONS.

Special steel. Referee: L. Guillet, Paris.

Metallography (slag inclosures, homogeneity, welding). Referee: E. Heyn, Gr.-Lichterfelde.

Hardness testing and resistance to mechanical wear. Referee: E. H. Saniter, Sheffield.

Impact tests. Referee: G. Charpy, Montluçon.

Testing metals by alternating stresses. Referee: H. Le Chatelier, Paris.

Testing of cast iron. Referee: E. Damour, Bayard.

Influence of increased temperature on the quality of metal. James E. Howard, Washington, D. C.

Paints on metallic structures. A. S. Cushman, Washington, D. C.

TECHNICAL PROBLEMS.

1. Preliminary work for the introduction of international specifications for iron and steel. (Chairman of Committee 1: A. Rieppel.)

1a and 1b. Introduction of international specifications for iron and steel. *a*. Steel and steel products. *b*. Cast iron and castings. (Chairman of both committees: A. Rieppel.)

4. Welding and weldability.

44. Special steels.

53. Defining the microscopic constituents of iron and steel. (Chairman of Committee 53: H. M. Howe.)

45. Inclosures of metallurgical products.

25. Methods of testing cast iron.

49. Classification of pig iron. (Committee 1b.)

26. Notched bar tests. (Chairman of Committee 26: G. Charpy.)

27. Hardness tests.

46. Mechanical wear of metals.

47. Alternating stresses.

54. Importance of the six qualities: Elastic limit, yield point, proportionality, tensile strength, resistance as notched bars, endurance, as to the safe working stress of structures.

28. Magnetic and electric properties.

38. Specifications for copper. (Chairman of Committee 38: G. Guillet.)

48. Influence of increased temperature.

24. Nomenclature of iron and steel. (Chairman of Committee 24: H. M. Howe.)

Customs Decisions

Chiropodists' Knives

The Board of United States General Appraisers has decided that so-called "corn" knives cannot be returned for duty at the rates specified for manicure knives. The Collector of Customs at New York held that the knives in question were similar to manicure knives, duty being assessed at the rate of 5 cents each and 40 per cent. ad valorem. Wiebusch & Hilger, New York, the importers, alleged that the duty should be 45 per cent. under the provision in the law for manufactures composed in chief value of metal. The knives have fixed blades, and are used by chiropodists for treating the feet. It seems that corn knives are not provided for by name in the present tariff act. General Appraiser Fischer, who writes the decision for the board, says that the articles are not included in the term "manicure" knives or in the provision for all knives having folding or other than fixed blades or attachments. Mr. Fischer states that it is apparent that the collector erred in assessing the merchandise under the similitude clause. The corn knives, it is held, must be classified, as claimed under the metal paragraph at 45 per cent. The collector is reversed.

Metal Cans

Small cans made of steel or iron used for holding powder and as containers for thermit in welding and other work are held by the Board of United States General Appraisers to be dutiable at the rate of 30 per cent. under the provision in the tariff of 1909 for "cylindrical vessels, for holding gas, liquids or other material whether full or empty." The cans, which were imported by the Goldschmidt Thermit Company, New York, were brought in empty, and were assessed for duty by the collector at the rate of 45 per cent. under the provision in the law for "manufactures in chief value of metal." The decision for the board says that in view of the evidence submitted it appears that the articles are properly classifiable as claimed under paragraph 151. The collector's action is reversed.

Miners' Rescue Appliances

A claim filed by Eduard Schenk, in which free entry was sought for tools claimed to be of the character of the goods exempted from duty under the act of 1909, was denied. According to the importer, the articles are miners' rescue appliances. They were classified by the customs officials as manufactures of metal with a duty of 45 per cent. It appeared to the satisfaction of the board that the tools in question consisted of different varieties, most of which, it is stated, are suitable for many other uses than in connection with the rescue of miners.

The Sterling Lubricator Company, Rochester, N. Y., announces the removal of its factory to Norwich, Conn., where its shops will be combined with those of the Uncas Specialty Company, the new combination to be known as the Sterling Machine Company. The increased shop capacity and generally improved manufacturing facilities will allow room for expansion and furnish better service for the trade. It is further hinted that Yankee ideas are at work on new things of interest. On and after March 15 all communications should be directed to the Sterling Machine Company, Norwich, Conn.

The Harris Pump & Supply Company, Pittsburgh, Pa., has increased its capital stock from $60,000 to $80,000.

The Cambria Steel Company

Report for the Year Ending December 31, 1910

The annual report of the president and directors of the Cambria Steel Company for the 12 months ending December 31, 1910, shows a net income of $4,553,332.72, against $2,538,086.64 in 1909 and $1,493,756.39 in 1908. The income account for 1910 and the balance sheet as of December 31, 1910, are as follows:

Income Account for 1910.

Income from operation, after deducting all expenses (including ordinary repairs and maintenance, approximately $3,200,000, currently charged during year to cost of production)		$5,230,930.45
Income from rentals, investments and interest		230,405.32
Earnings		$5,461,335.77
*Less expended for extraordinary replacements		514,529.29
Net earnings		$4,946,806.48
Deduct fixed charges under Cambria Iron Company lease		393,473.76
Net income		$4,553,332.72
Dividends		2,250,000.00
Surplus net income for year		$2,303,332.72
Which has been expended as follows:		
General depreciation	$100,000.00	
Betterments and improvements	2,090,039.07	
		2,190,039.07
Balance to profit and loss account		$113,293.65
Profit and loss account December 31, 1909		$2,398,728.62
Balance of income account transferred as above		113,293.65
		$2,512,022.27
Reduced by bad or doubtful accounts in 1910	$113,841.02	
Less collection of accounts charged off in previous years	15,908.61	
		97,932.41
Profit and loss account December 31, 1910		$2,414,089.86

*In former reports this item was deducted before arriving at earnings from operation and not shown separately.

BALANCE SHEET DECEMBER 31, 1910.

Assets.

Lease hold in Cambria Steel Company:		
Property, works, coal, ore lands, &c., subject to payment of $338,720 annual rental, under Cambria Iron Company lease for 999 years, being 4 per cent. on $8,468,000 Cambria Iron Company's stock		$33,090,304.68
Plant additions to December 31, 1909	$12,635,124.18	
Less one-half cost of office building on Steel Company property	88,219.38	
	$12,546,904.80	
Plant additions year ended December 31, 1910	2,090,039.07	
		14,636,943.87
Total leasehold		$47,727,248.55
Ownership in Cambria Steel Company:		
Equipment additions	$1,188,723.93	
Real estate	424,892.37	
Stock in ore and steamship companies, &c	1,594,109.92	
Inventory account:		
Materials, supplies and products	10,467,502.22	
Cash	655,463.62	
Accounts receivable	3,139,776.22	
Bills receivable	93,681.64	
Total ownership	$17,564,149.92	17,564,149.92
Total		$65,291,398.47

Liabilities.

*Capital stock	$45,000,000.00
General depreciation	3,850,000.00
Betterment and improvement account	11,690,039.07
Accounts payable, including Dividend No. 21, $562,500	2,337,269.54
Profit and loss	2,414,089.86
Total	$65,291,398.47

*The authorized capital stock named in charter is $50,000,000, of which $45,000,000 have been issued. The remaining $5,000,000 of stock cannot be issued at less than par.

The statement by President Charles S. Price and Chairman Effingham B. Morris shows that notwithstanding the curtailment in demand which was evident by midsummer last year and became acute by October, when it represented only about 50 per cent. of capacity, the shipments of steel products for the year were the largest in the company's history, exceeding the previous record of 1906 by 6 per cent. The average of prices for the year was about $4 a ton below those for the same products in 1906, apart from rails.

Improvements and New Plant

A review is given of the condition of the company's properties, together with a statement of improvements made in 1910. The Johnstown coal mines produced 1,450,000 gross tons of coal. The building of a plant of 400 by-product coke ovens in the Hickston's Run Valley coal field, adjoining the works, has not yet been undertaken owing to uncertainties surrounding the engineering development of the larger sized ovens. Four 50-ton furnaces were added to the open hearth department of the Cambria plant, making it an 8-furnace group. The 18-in. continuous billet mill was completed and operative in March. At the Gautier plant the 8-in. semi-continuous mill was completed and tried out November 1. The 12-in. mill there is under construction and will be completed in the spring of 1911. The new rod mill is completed and the wire mill begins production this month.

Progress is reported on the construction of the Quemahoning reservoir and pipe line. The breast of the dam is 90 ft. high by 800 ft. long; the storage capacity, 11,000,000,000 gal.; the pipe line 66 in. diameter and 13.8 miles long, running down the valley of the Stony Creek River. The pipe line involves 9050 ft. of concrete lined tunnels and 13 river crossings, aggregating 4072 ft. of river bed work, mainly in rock, all concreted in place. The pipe line is of steel plate construction, the steel being fabricated in the company's own shop. This improvement will be completed in the summer of 1912, though partial storage will be possible by the fall of 1911.

In the early months of the year the average number of employees was 17,380, while in December only 14,116 were employed, most of these on partial time.

Additions to the plant since the organization of the Cambria Steel Company August 17, 1901, as shown on the balance sheet for December 31, 1910, amounted to $14,636,943.

The Railway Steel Spring Company's Earnings

At the annual meeting of stockholders of the Railway Steel Spring Company, held recently, the financial statement for the year ended December 31, 1910, was presented, showing gross earnings of $10,035,435, against $7,843,202 in the previous year. Manufacturing operations and administration expenses amounted to $7,734,535, against $5,782,754, while $350,000 was charged off for depreciation, against $194,077. This left net earnings of $1,950,900, an increase of $84,439.

The income account compares as follows:

	1910.	1909.
Net earnings	$1,950,900	$1,866,461
Interest	195,823	202,701
Surplus	$1,755,077	$1,663,760
Preferred dividends	745,000	945,000
Surplus	$810,077	$718,759
Previous surplus	2,989,701	2,270,942
Total surplus	$3,799,778	$2,989,701

In his report to the stockholders President F. F. Fitzpatrick says: "The latter part of the year 1910 has shown a tendency toward a period of dullness, but it is not the belief of the company's management that this period will be prolonged, and a fair business is anticipated for the current year."

At the meeting Otis H. Cutler was elected a director to succeed the late Frank S. Laying. Other directors were re-elected. Mr. Cutler is president of the American Brake Shoe & Foundry Company.

The United Steel Company, Canton, Ohio, has removed its Chicago office from 33 Dearborn street to 1132 Commercial National Bank Building. A. Schaeffer is Chicago manager. The company established its Chicago office two years ago, and has found it desirable to seek a more central location. The Commercial National Bank Building is occupied chiefly by the offices of steel manufacturers.

Workmen's Insurance in Europe

Report by the United States Bureau of Labor

The remarkable progress made in recent years by foreign countries on the subject of employers' liability and workmen's compensation is brought out by the first of two volumes comprising the Twenty-fourth Annual Report, just issued by the United States Bureau of Labor, Department of Commerce and Labor, entitled "Workmen's Insurance and Compensation Systems in Europe." This volume treats of Austria, Belgium, Denmark, France and Germany. Volume II, now in the hands of the printer, relates to Great Britain, Italy, Norway, Russia, Spain and Sweden.

The German System

The country with the most complete system of workmen's insurance is Germany, where practically the entire wage earning population is required by law to be provided with some form of insurance against industrial accidents, sickness, invalidity and old age. Benefits are also provided in case of maternity for wage earning women, while for some industries there is a system of insurance to provide benefits for the widows and orphans of wage earners. German employers defray the entire cost of accident insurance, and it includes practically all the industrial workers in the country. The most striking evidence of the wide scope of this system is contained in the figures for the operations of the year 1908. In this year the number of persons insured against accident was about 27,000,000, the total receipts were about $57,000,000, and the total expenditures were about $48,000,000. The number of workmen compensated for the first time in the year 1908 was 143,000. Separate laws provide a system of compulsory sickness insurance for wage earners, in which the employers pay one-third and the workmen two-thirds of the expense. In 1908 the number of persons (not including agricultural laborers) insured against sickness was about 13,000,000, the receipts were $95,000,000, and the expenditures were $91,000,000. Besides these two branches there is a third national compulsory system relating to insurance for old age and invalidity, in which the employers and the workmen each pay equal amounts, while the Imperial Government provides a liberal subsidy. In 1908 the number of persons insured under this branch was 15,000,000, the receipts were $68,000,000, and the expenditures were $48,000,000.

A number of cities in Germany are now providing subsidies for organizations providing benefits in case of unemployment; this is usually done by repaying to trade unions and similar organizations a percentage of the expenditures they make for out-of-work, travel, &c., benefits.

The Austrian and French Systems

In Austria the system of workmen's insurance is patterned closely after that of Germany, and provides relief for cases of sickness and accident to workmen engaged in manufacturing and similar industries, though there is a separate organization for the mining industries. The expense of the accident insurance is borne nine-tenths by the employers and one-tenth by the workmen, while the expense of the sickness insurance is defrayed in the proportion of one-third by the employer and two-thirds by the workmen. For the mining employees there is insurance for sickness, accident and old age. One feature of workmen's insurance in Austria which no other country possesses is a national compulsory system of old age and invalidity insurance for salaried persons, such as clerical employees of all kinds; the expense of this is defrayed partly by the employer and partly by the insured person.

In France the different types of insurance are provided by a great variety of institutions and regulated by a series of separate laws and decrees. The insurance of workmen against industrial accidents is regulated mainly by the law of 1898. The employer is required to provide at his own expense a specified system of benefits to injured workmen, and to protect himself he is allowed to insure his liability under the law in a variety of institutions, such as voluntary associations of workmen or of employers, private insurance companies, Government insurance funds, &c. In some industries insurance against sickness is compulsory, but in the main the French Government has preferred to grant certain privileges to mutual sickness insurance societies, and those complying with certain requirements receive subsidies from the National Government. In 1910 a law was enacted providing for a system of old age pensions, though a previous law of 1905 had already put into operation a system of relief for indigent and disabled aged persons. The activities of the French Government also extend to the field of unemployment insurance.

The Belgian and Danish Systems

The situation in Belgium resembles that existing in France; at the present time the various forms of workmen's insurance in operation relate to distress caused by accident, sickness, old age and invalidity, and unemployment. The Belgian law of 1903 requires employers to pay at their own expense a specified scale of benefits to workmen injured in the course of their employment. A government institution offers to workmen old age insurance policies on favorable terms, while both the employers and the workmen have organized mutual aid societies to provide sickness insurance. The system of subsidizing unemployment insurance, now called the Ghent plan, originated in Belgium and has reached its greatest extent there; the cities, provinces, &c., in practically every part of the kingdom are now liberally subsidizing trade unions and similar organizations which provide systems of insurance for unemployed workmen.

In Denmark, the report shows that there are now in operation systems of accident insurance for the principal groups of wage earners in the kingdom, systems of sickness insurance through mutual aid societies subsidized by the State, and systems of old age relief for those not able to support themselves. In addition the laws of 1907 and 1908 permit the local and national governments to subsidize trade unions and other organizations providing relief in case of unemployment not due to the fault of the worker.

In practically all of the countries just mentioned the accident insurance and compensation laws provide for the award of fixed sums to injured employees without the necessity of a lawsuit and without reference to the negligence of the workman, unless the employer can prove gross negligence on the latter's part.

The information contained in the report shows that in no case has any country, after having adopted a system of compensation or insurance, ever gone back to the liability system; in practically all of these countries there is a widespread demand for the improvement and extension of the existing systems and in the largest of these countries—Austria, France and Germany—government commissions are now at work planning for the revision and enlargement of the systems.

A Congress of Technology at Boston

A congress of technology will be held in Boston, Mass., April 10 and 11, in celebration of the fiftieth anniversary of the granting of the charter of the Massachusetts Institute of Technology. In line with this idea, the 50 or more papers which will be presented at the congress will be written by graduates of the institute, and will thus serve to record the part the alumni of the institution have taken in the development of scientific industry.

As the titles of these papers are sent in by the writers it is becoming evident that the managers of the congress will succeed in their effort to make the proceedings show from another point of view the general industrial advance that has taken place during the past 50 years under the guidance of trained engineers. The papers will cover a wide range of subjects, from architecture to sewage purification, and the names and professional standing of the writers show that they will together discuss authoritatively every important problem of modern industrial technique and management. It is already

clear that this record is not limited to any narrow activity within merely technical lines, but that it covers the broader problem of the relations of science to industry, the place of the engineer in erecting a more efficient type of industrial management, and the general shaping of material conditions to serve alike the changing conditions of business and the improving conditions of labor.

New Pennsylvania Electric Locomotives

An order has recently been placed by the Pennsylvania Railroad with the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., for nine electric locomotives aggregating about 40,000 hp. These will be of the same type as and will supplement the 24 already in use for handling trains between the Manhattan Transfer station, near Harrison, N. J., and the company's terminal at Seventh avenue and Thirty-second street, New York City. The mechanical part of the locomotives, including the cabs, frames and running gear, will be built by the railroad company at its Juniata shops, while the air brakes will be supplied by the Westinghouse Air Brake Company and the electrical equipment will be built by the Westinghouse Electric & Mfg. Company. The complete locomotives will be assembled at the East Pittsburgh shops of the last named firm and the contract date for completion is July 1, 1911.

These locomotives, which are articulated machines of the double cab design, are by far the most powerful ever built. A 2000-hp. 600-volt direct current interpole motor with a cast steel frame and complete electrical equipment are carried on each half. The two halves are coupled together at their driving wheel ends by permanent couplings of twin draw bars and Westinghouse friction draft gears, and the arrangement is such that one half serves as a leading truck and the other as a trailer in whichever direction the locomotive may be moving. The motors are directly connected to the driving wheels through jack shafts and side rods. In general character the driving wheels and trucks are similar to the American type of steam locomotive. This arrangement of wheels and motors was decided upon after a number of different forms of motor drive and wheel arrangement had been experimented with in an effort to secure the maximum amount of steadiness when running at full speed. If one motor is cut out, the locomotive can be operated from either cab by the remaining motor. As the halves are interchangeable, it is possible to replace either one by another part if repairs have to be made. The unit switch field control system is employed and permits two or more locomotives to be coupled together, the whole being operated from either end of any one cab. In this way flexibility of speed regulation is secured, while at the same time two additional running notches are made available and economical power consumption during the acceleration period is made possible.

The folowing table gives some of the characteristic features of these locomotives:

Weight of each motor complete with cranks, pounds	43,000
Hight of motor frame above cab floor, feet and inches	5 6½
Hight of center of shaft above cab floor, feet and inches	2 1½
Weight of locomotive complete, pounds	312,000
Weight on drivers, pounds	200,000
Weight on each driving axle, pounds	50,000
Weight on each bogie truck, pounds	57,000
Total overall length, feet and inches	64 11
Rigid wheel base of each half, feet and inches	7 2
Total wheel base of each half, feet and inches	23 1
Total wheel base of locomotive, feet and inches	55 11
Diameter of drivers, inches	72
Tractive effort, pounds	60,000
Normal speed, miles per hour	60

The equipment of each cab includes both automatic and straight Westinghouse air brake mechanism, train lighting apparatus, electric headlights, pneumatically operated whistle and track sanding device, as well as the motor unit switches and the master controller.

The Hercules Motor Truck & Car Company, Grove City, Pa., is about to extend its operations by taking over the space that another line of work has occupied heretofore. The whole plant is to be devoted to the manufacture of Hercules high grade commercial vehicles and pleasure cars. Some new ideas have been incorporated in the engine and transmission. The company will specialize in light and medium weight trucks.

The Wisconsin Engine Company

The Wisconsin Engine Company, Corliss, Wis., has made a very considerable addition to its equipment and working capital, in order to allow it to enter extensively into new lines of manufacture. Up to the present time this company has been controlled by strong Pittsburgh interests. On account of the location of the plant, it became desirable to bring Milwaukee capital into the company and changes just made in the directorate will bring about far more intimate connection with the details of the business than has been possible heretofore when the company was controlled in Pittsburgh.

The principal business of the Wisconsin Engine Company has been the manufacture of Wisconsin-Corliss engines, and in this field it has won an enviable reputation, as such engines, including some of the largest which have ever been built, may be found in operation in every section of the country. Due to certain distinctive features of design, these engines are satisfactorily operated at higher speeds than are desirable with the ordinary design of Corliss engine, and it is probably due to this fact that the company has maintained a large and growing business in Corliss engines in the face of competition by the steam turbine.

It is the purpose of the new organization to foster and to build up the existing Corliss engine business, but the addition of new capital and new equipment is chiefly for the purpose of enabling the company to enter extensively into new lines of manufacture. Chief of these will be the Adams gas engine, which will be manufactured in sizes from 200 to 3000 hp. in a single unit. The company was fortunate, even before its new organization was perfected, in securing orders for upward of 10,000 hp. of the Adams engines, and increased shop facilities and new equipment are now being installed to permit of the rapid and economical production of this additional line of manufacture.

E. T. Adams, the new president of the company, is an engineer who is well known among the users of heavy machinery throughout the country. He has been identified with the manufacture of heavy machinery for many years, dating back to the early days of the Edward P. Allis Company in Milwaukee, where under Mr. Reynolds he was connected with the design and installation of most of the important power and pumping installations in the country. Mr. Adams was a pioneer in the heavy gas engine business in the United States, being identified with the first large gas engines put out by the Westinghouse Company, and later as manager and chief engineer of the gas and mill engine department of the Allis-Chalmers Company. He inaugurated the department and built up for that company the largest gas engine business ever enjoyed by any company in the world. It is probable that considerably over half of the large gas engines now in operation in this country are of Mr. Adams's design, including the well-known plant of the United States Steel Corporation at Gary, Ind.

During the past few years there has been far greater advancement than is generally realized in knowledge of the practical operation of large gas engines, and the large engine designed in the light of this experience has become as simple and reliable as a Corliss engine and has crystallized into a form that will, undoubtedly, remain as a standard for many years to come. It is interesting to note that the German builders of large engines take the same view of this matter, and the larger German firms are this year doing what the Wisconsin Engine Company is doing, namely, redesigning their engine in the light of past experience in this field. They are preparing to enter upon its manufacture, as is the Wisconsin Company, with jigs and special tools for the accurate duplication of parts, firm in the belief that gas engine design has now reached a basis where such standardization is commercially possible.

January Exports and Imports of Iron and Steel

The January report of the Bureau of Statistics of the Department of Commerce and Labor shows an increase in our iron and steel exports and a decrease in imports as compared with December. The total value of the exports of iron and steel and manufactures thereof, not including ore, in January, was $18,739,961, against $18,300,710 in December. The value of similar imports in January was $2,874,740, against $3,145,706 in December.

The December exports of commodities for which quantities are given totaled 152,140 gross tons, against 149,645 tons in December. Details of the exports of such commodities for January and for the seven months of the current fiscal year ending with January are as follows, compared with corresponding periods of the previous fiscal year:

Exports of Iron and Steel.

	January,		Seven months ending January,	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	10,848	4,807	96,524	42,369
Scrap	5,066	383	19,052	6,992
Bar iron	1,194	1,308	9,725	7,835
Wire rods	471	856	9,743	12,197
Steel bars	7,648	7,342	67,278	49,918
Billets, blooms and plates	11,731	3,080	62,430	47,103
Steel rails	43,127	41,999	205,675	220,945
Iron sheets and plates	9,009	9,119	57,274	50,471
Steel sheets and plates	12,225	12,774	103,580	71,576
Tin and terne plates	2,857	851	8,631	5,849
Structural iron and Steel	12,152	8,319	83,859	53,533
Barb wire	6,014	4,365	48,685	42,596
Wire	9,307	8,555	55,843	43,601
Cut nails	916	472	5,802	6,045
Wire nails	4,485	2,760	26,510	18,314
All other nails, including tacks	782	595	6,486	4,462
Pipe and fittings	14,308	11,189	95,978	100,857
Totals	152,140	118,274	963,075	784,663

The imports of commodities for which quantities are given totaled 32,795 gross tons in January, against 31,619 tons in December. Details of the imports of such commodities for January and for the seven months of the current fiscal year ending with January are as follows, compared with corresponding periods of the previous fiscal year:

Imports of Iron and Steel.

	January,		Seven months ending January,	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	19,177	22,796	136,357	140,337
Scrap	303	19,047	15,711	80,301
Bar iron	2,325	2,178	18,544	14,238
Billets, bars and steel in forms n.e.s.	2,865	5,167	25,131	18,082
Sheets and plates	292	609	2,672	3,690
Tin and terne plates	5,677	5,309	36,097	38,091
Wire rods	2,156	1,101	11,669	5,958
Totals	32,795	56,207	246,181	300,697

The imports of iron ore in January were 102,600 gross tons, against 173,710 tons in December and 284,823 tons in January, 1910. The total quantity of iron ore imported in the seven months of the current fiscal year ending with January was 1,434,365 gross tons, against 1,407,233 tons in the corresponding period of the previous fiscal year. Of the imports in January, 80,150 tons came from Cuba, 17,687 tons from Spain, 363 tons from Canada and 4400 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, excluding ore, in the seven months of the current fiscal year ending with January was $123,600,379, against $97,235,095 in the corresponding period of the previous fiscal year. The total value of similar imports was, respectively, $21,152,356 and $21,245,874.

The Tennessee Coal, Iron & Railroad Company has blown in an additional furnace at Ensley, Ala., making a total of three stacks now being operated at Ensley and one at Bessemer.

Foundrymen Report on Pig Iron Stocks and the Outlook

The pig iron firm of Hickman, Williams & Co. recently sent out from its Chicago office a letter to foundrymen, asking concerning stocks of pig iron in foundry yards and also as to business conditions and the outlook. Over 500 answers were received. Some of these gave an incomplete record, so that the tabulation below represents only 473. The average supply of pig iron in foundry yards is about 70 days. The reports on the condition of business are classified under good, normal and poor, and opinions on the outlook are under four heads—good, improving, questionable and poor:

State.	No. cos.	Av. sup. Days.	Business. G.	N	P.	Outlook. G.	I.	Q.	P.
Alabama	7	26	4	5	2	5	3	1	2
Arkansas	1	230	..	1	..	1	..	..	..
Colorado	3	55	..	1	2	..	3	..	..
Connecticut	11	103	4	9	2	5	8	1	1
Florida	1	60	1	1	..	1	1	..	..
Georgia	7	41	4	1	2	3	3	..	..
Delaware	1	75	..	..	1	..	..	1	..
Indiana	29	84	12	10	2	17	13	1	2
Illinois	67	78	17	34	22	27	35	1	10
Iowa	11	109	6	5	..	5	6	..	..
Kansas	2	157	..	3	..	1	1	..	1
Kentucky	5	99	3	1	1	3	1	1	..
Louisiana	1	300	..	1	..	..	1	..	..
Maryland	2	82	1	..	1	..	1	..	1
Massachusetts	27	93	5	15	9	10	12	4	3
Maine	1	60	1	1	..	..	2	..	..
Michigan	32	57	19	8	7	20	9	2	3
Minnesota	6	85	3	3	2	4	4	..	..
Mississippi	2	82	1	1	..	1	1	..	..
Missouri	16	86	2	11	5	4	12	..	2
N. Hampshire	2	136	1	..	1	2	..	..	..
New Jersey	10	40	4	2	5	4	5	1	1
New York	46	71	14	28	7	23	22	1	2
North Carolina	7	37	4	3	2	4	2	1	2
Ohio	71	60	27	40	16	27	39	7	9
Pennsylvania	55	39	17	32	13	22	31	4	6
Rhode Island	4	193	2	1	1	2	..	1	1
South Carolina	1	30	..	1	..	1	..	..	..
Tennessee	9	28	5	4	4	6	5	..	2
Texas	4	76	2	1	2	3	..	..	2
Vermont	2	30	1	1	..	1	1	..	..
Virginia	3	33	1	1	1	2	1	..	..
West Virginia	4	35	1	2	1	2	..	1	1
Wisconsin	23	92	8	9	6	12	7	1	3

RECAPITULATION.

Number of concerns	473	Outlook—Good	218
Average days supply	69.66	Improving	229
Business—Good	170	Questionable	29
Normal	245	Poor	54
Poor	117		

A Gröndal Iron Ore Briquetting Plant

The Northwestern Iron Company, Mayville, Wis., has contracted with the American Gröndal-Kjellin Company, New York, for the building at its Mayville blast furnace plant of a Gröndal briquetting plant of two kilns with a combined capacity of 200 tons of briquettes a day. Construction will begin at once, and it is expected the plant will be in operation in June of this year. Briquettes will be made both from the furnace company's Mayville ore and from the accumulations of flue dust at its two blast furnaces. The new plant will be laid out so that two kilns can be added later. The briquettes will be 6 x 6 x 3 in., as charged into the kiln and the final product will be about 2½ in. thick.

There are now in operation in the United States seven Gröndal kilns for the briquetting of ores, and three under contract, the third of these being now under construction at the plant of the Electric Smelting & Aluminum Company, at Sewaren, N. J.

The Great Lakes Engineering Works, Detroit, Mich., is reported to have secured orders from New England interests for four ocean-going steamers and several barges for the Atlantic coastwise coal trade. The contract involves $1,650,000. The boats will be of the Welland canal size, 257 ft. in length and 43 ft. beam, being the maximum sized vessels that can go through the canal. The steamers will have a capacity of 4000 tons and the barges 2500 tons.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Right to Rescind Contract to Purchase for Delay in Delivering.—An agreement to sell an account register, to be delivered April 1 or as soon thereafter as practicable, cannot be canceled by the buyer for failure to deliver until May 30, where the delay is explained.—New York Supreme Court, American Case & Register Company *vs.* Griswold, 125 New York Supplement 4.

Buyer's Right to Recover for Loss of Profits Caused by Seller's Breach of Warranty.—On a breach of an express or an implied warranty of articles sold, recovery can be had by the buyer for loss of profits not dependent upon speculative contingencies, but shown to be certain, fixed in amount and reasonably to be anticipated from the breach, where it appears that the loss of the profits is due solely to the seller's breach of his contract.—Georgia Court of Appeals, Hirsch *vs.* J. S. Schofield's Sons Company, 68 Southeastern Reporter 1077.

Buyer's Right to Recover Payment for Freight on Canceling Contract.—An agreement for a sale of machinery which requires the buyer to settle for the machinery by paying freight charges and by giving notes for the price, and which entitles him to six days' trial of the machinery, and a return thereof on the seller being unable to comply with the warranty, gives to the buyer the right to recover from the seller the freight charges paid, on breach of the warranty.—Iowa Supreme Court, Reeves & Co. *vs.* Younglove, 127 Northwestern Reporter 1017.

Measure of Damages for Breach of Contract.—Those damages which are the natural and probable result of a breach of a contract, those which the parties may reasonably anticipate as the effect of the breach under the particular circumstances of the case which are known to them when the contract is made, and those only, may be recovered in an action upon a contract.—United States Circuit Court of Appeals, Eighth Circuit, Northwestern Steam Boiler & Mfg. Company *vs.* Great Lakes Engineering Works, 181 Federal Reporter 38.

Right of Buyer to Rely on Warranties.—Provision in a contract of sale that machinery is warranted to do the work for which it is intended, and that if the buyer does not notify the seller to the contrary within five days from first day's use, the machinery shall be considered satisfactory, gives to the buyer five days within which to give notice, and where he does not do so, and there is no waiver of the condition, he cannot rely on the warranties.—Texas Court of Civil Appeals, Caples *vs.* Port Huron Engine & Thresher Company, 131 Southwestern Reporter 303.

Rights of Seller of Engine Under Warranty.—Where a company sold a stationary engine under a special warranty that the complete equipment should be free from defects in material or workmanship, it was entitled to a reasonable time in which to get everything adjusted and put in good running order.—Kentucky Court of Appeals, Higgins *vs.* Dean Gas Engine & Foundry Company, 130 Southwestern Reporter 800.

Validity of Provisions for Liquidated Damages Under Contract of Sale.—An agreement to pay $25 as liquidated damages for each day's delay in delivering electric cranes will be enforced as a reasonable provision where the damage resulting from the delay is not readily ascertainable or subject to estimate.—Alabama Supreme Court, Cleveland Crane & Car Company *vs.* American Cast Iron Pipe Company, 53 Southern Reporter 313.

When Articles Sold Should Be Delivered—Acceptance of Orders.—If an agreement for a sale of articles does not provide the time within which they are to be delivered, the law requires delivery within a reasonable time. If a dealer has sought an order he is deemed to have accepted it at once, and if signed by the buyer it becomes a binding contract; no other acceptance or notice of acceptance by the dealer being necessary.—Oklahoma Supreme Court, Cameron Coal & Mercantile Company *vs.* Universal Metal Company, 110 Pacific Reporter 720.

Rights Under Sales Agency Contracts.—The employment of a sales agent does not, in the absence of an agreement to that effect, preclude the principal from making a sale, and if the contract should expressly provide that the principal would not appoint any other agent to sell a specific article, or to sell in a specified territory, still, if the contract did not give the agent the exclusive right to sell such article, or to sell in such territory, such agent would not be entitled to commission upon a sale made by the principal without the assistance of the agent.—Texas Court of Civil Appeals, J. I. Case Threshing Machine Company *vs.* Wright Hardware Company, 130 Southwestern Reporter 729.

Authority of Traveling Salesmen in Collecting.—The mere fact that a traveling salesman is authorized to make collections does not authorize him to indorse and discount notes executed by customers to his house.—Michigan Supreme Court, Lonier *vs.* Ann Arbor Savings Bank, 127 Northwestern Reporter 685.

Passing of Title and Measure of Damages Under Contracts of Sale.—Where there is a sale of articles generally no title in them passes until delivery, because until then the very goods are not ascertained. But where by the contract itself the seller appropriates to the buyer a specific article and the latter thereby agrees to take it and to pay the stipulated price, the parties are then in the same situation as they would be after a delivery of goods in pursuance of the general contract. The very appropriation of the article is equivalent to delivery by the seller, and the assent of the buyer to take the specific article and to pay the price is equivalent to his accepting possession. The effect of the contract, therefore, is to vest the property in the buyer. Where the seller appropriates to the buyer a specific article which the buyer agrees to take and pay for, the measure of damages on a breach of contract by the buyer is the contract price and not the excess of the contract price over the market value at the time actual delivery was to be made, though the article has merely a potential existence when the contract is made, and does not actually exist until thereafter.—Pennsylvania Supreme Court, Henderson *vs.* Jennings, 77 Atlantic Reporter 453.

The Association of American Steel Manufacturers

PITTSBURGH, PA., March 8, 1911. (*By Telegraph.*)—The annual meeting of the Association of American Steel Manufacturers was held in the Fort Pitt Hotel, Pittsburgh, on Tuesday, March 7. The meeting was well attended, 26 representatives being present in person from the largest steel concerns in the country, the association now having a total membership of 31 of the important steel companies. Encouraging reports were made as to the progress reached in having the steel manufacturers adopt the specifications on different materials as suggested at the meeting held in Pittsburgh early last year, particularly in the specifications for concrete reinforcement bars. Reports submitted showing that these specifications have been adopted by many leading engineering concerns throughout the country, including the Isthmian Canal Commission. The subject of boiler plate specifications was discussed at some length.

A pleasing feature of the meeting was the presentation of a silver coffee set to W. A. Bostwick, the retiring president, who has also resigned from the Carnegie Steel Company to become vice-president of the Oxford Copper Company, New York City. The presentation speech was made by J. L. Haines of the Jones & Laughlin Co., and was happily responded to by Mr. Bostwick. New officers of the association were elected as follows: A. A. Stevenson, vice-president Standard Steel Works, Burnham, Pa., president; P. E. Carhart, inspecting engineer Illinois Steel Company, vice-president, and J. J. Shuman, Jones & Laughlin Steel Company, who has very acceptably filled the dual position of secretary and treasurer, was unanimously re-elected.

Lake Superior Iron Ore Shipments in 1910

Statistics of shipments by mines from the Lake Superior iron ranges in 1910 are compiled by the *Iron Trade Review*. They show that the estimate of 43,500,000 tons made heretofore on the basis of the shipments by water in the season of navigation, was close to the actual. The total by lake, as already given in these columns, was 42,628,758 gross tons and the total by rail 813,639 tons, making the grand total 43,442,397 tons. The following table shows the shipments by ranges for 1910 and the preceding three years:

	1910.	1909.	1908.	1907.
Marquette range...	4,392,726	4,256,172	2,414,632	4,388,073
Menominee range...	4,237,738	4,875,385	2,679,156	4,964,728
Gogebic range.....	4,315,314	4,088,057	2,699,856	3,637,102
Vermillion range...	1,203,177	1,108,215	841,544	1,685,267
Mesaba range.....	29,201,760	28,176,281	17,257,350	27,495,708
Miscellaneous	91,682	82,759	122,449	95,790
Totals.....	43,442,397	42,586,869	26,014,987	42,266,668

In the above total "miscellaneous" refers to the ore mined in Wisconsin. Last year it all came from the Iron Ridge and Mayville mines.

The Diamond Toggle Bolt

A new type of toggle bolt in which no rivets are used and which is said to possess great strength has been recently brought out by the Diamond Expansion Bolt Company, 90 West street, New York City. These bolts are so designed that as soon as the bolt is turned the

Fig. 1.—The Bolt Complete for Insertion in Hole.
Fig. 2.—The Bolt Inserted in the Head. Fig. 3.—The Head.
Three Views of the New Diamond Toggle Bolt and Head Made by the Diamond Expansion Bolt Company, New York City.

job is completed and no cutting off of threaded ends is required. The strength of this bolt is said to be due to the fact that there is a bearing on both sides of the head against the surface of the hollow wall to which it is attached.

The bolt has a pressed one-piece head, which is shown in Fig. 3. In use an ordinary stove bolt nut is inserted diagonally across the channel through the slot in the toggle head. The bolt is inserted for a few threads through the open end of the channel, as shown in Fig. 2, and the channel is then turned back over the bolt, Fig. 1, and placed in the hole. These bolts are furnished with two sizes of head, having slots 3-16 and ¼ in. wide, respectively. If desired the bolts can be furnished with screws ranging in length from 3 to 6 in. for the smaller size of head and from 3½ to 6 in. for the larger.

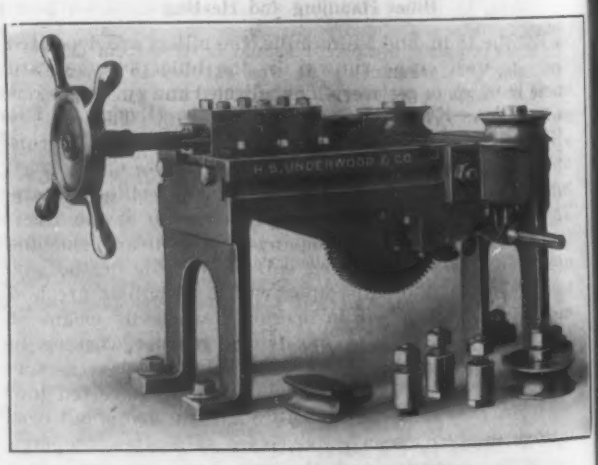
The Chicago Railway Equipment Company

The eighteenth annual report of the Chicago Railway Equipment Company presents the balance sheet of December 31, 1910, which shows current assets of $1,310,014, to which are added $1,247,994, representing property account and $867,720 for good will and patents. The above amounts with $20,149 of deferred charges for future operations make a total of $3,345,877. The total capital liabilities are $2,535,000; the current liabilities, $85,925; the reserves for contingencies and shrinkage in inventory, $45,000, and for depreciation, &c., including appropriations from earnings during the year, $156,926. The surplus is $523,027. The dividends paid in 1910 and charged to surplus account were $173,906. The report says that the earnings in 1910 were sufficient to provide for the 7 per cent. dividend, and make a substantial addition to surplus. Referring to business conditions in the past year, particularly as affecting the purchases of the railroads, President E. B. Leigh says that in the first half of 1910 the company secured a fair volume of business; that in the second half the attempt of the railroads to increase freight rates precipitated a bitter controversy, "the immediate and continuing effect of which was and has been to cause great conservatism on the part of railroad managers with a very marked curtailment of purchases, a condition which still exists."

A New Underwood Power Bender and Straightener

A new power bending and straightening machine has been placed on the market by H. B. Underwood & Co., 1026 Hamilton street, Philadelphia, Pa. This machine will handle a variety of work, and will not only bend various kinds and sizes of pipe, structural shapes and round and flat bars, but will also straighten material quickly and very effectively. One of its special features is that instead of requiring a number of dies and formers it is only necessary to have sets for the different diameters. These can be set in different positions, and enable a great variety of shapes and radii of bends to be secured.

The machine is belt driven, and has tight and loose pulleys requiring no countershaft. It is declared to be more economical than a machine driven by compressed air, and is not limited to use where a supply of air is available. The machine is not complicated, and little skill is required to operate it. As the bend proceeds the stock is moved along, and the hand wheel, controlling the movement of the bending ram, turned. It is possible to bring a large amount of power to bear on the work. A powerfully back geared eccentric shaft having a small throw and moving with a fixed stroke actuates a reciprocating ram in which slides a second ram carrying the former to be used; its movement is controlled by the hand wheel operated screw. In this way a very fine means of adjustment is secured, and the work can be bent exactly to the required curvature. This hand wheel adjustment also facilitates producing duplicate work, as any number of pieces can be bent exactly alike by returning the hand wheel to the same position each time. The formers or resistance studs on each edge of the bed slide in a T-slot, and others are cut across the bed so that the formers can be fastened in very many different positions. In bending



A New Power Bending and Straightening Machine for Pipe, Bars and Flats Built by H. B. Underwood & Co., Philadelphia, Pa.

pipe in this machine the former follows up the work and exerts a little more pressure at each succeeding stroke, an arrangement which is more effective than a sudden bend or trying to shape the piece at one stroke. The machine is said to be equally effective for straightening bent work and pieces of pipe which have been bent into various complicated shapes have been easily and quickly straightened.

The Rogers-Brown Iron Company is sinking a concrete shaft at its Rogers mine at Iron River, Mich. The company has also removed 2,500,000 cubic yards of overburden from its Susquehanna mine at Hibbing, Minnesota, leaving 4,500,000 cubic yards still to be removed.

The Five New Merchant Mills at Gary

Details of a Notable Group of Electrically Driven Mills of the Indiana Steel Company, Each with a Capacity Above 100,000 Tons a Year

In keeping with the advanced construction exemplified in all that has been built at the Gary Works of the Indiana Steel Company, there is nearing completion at Gary a modern arrangement of five merchant bar mills for the production of small structural shapes, special shapes and merchant bars of various kinds required by the merchant trade. Following the policy of the company in the construction of previous mills, all of the machinery is driven by electric motors. Thus the loss by leakage of hydraulic systems and the low efficiency due to the transmission of liquids through numerous pipes are avoided; also the installation of steam boiler plants for the operation of engines, the company planning to have enough power from the gas engines using blast furnace gas to furnish all necessary current for the operation of the motors. The mills are compactly arranged in order to facilitate handling raw material and the disposal of the finished product. Fig. 1 gives a general plan view.

The merchant bar mill plant consists of five mills of the following sizes: 18-in., 14-in., 12-in. Nos. 1 and 2, and 10-in. No. 1. Each mill will have a capacity of 8000 to 12,000 tons per month. The sizes to be rolled will include everything from 6-in. I-beams down to ½-in. bars, for which billets of a wide range of sizes are available from the billet mill located at these works, described in *The Iron Age* of October 21, 1909, p. 1226. The billets for these various mills are stored in the billet and bloom storage yard at the east end of the mills, this yard being served by two overhead traveling cranes of 20 tons capacity each and 102 ft. span, equipped with trolleys having two hooks and built by the Alliance Machine Company, Alliance, Ohio.

Billet Handling and Heating

For the 18-in. and 14-in. mills, the billets are deposited near the west crane runway of the billet storage yard crane in a space between two crane runway extensions for the billet crane running into the mill. Thence they are taken by small cranes, equipped with magnets, running under the west girder mentioned above and carried into the mill and placed on the skids of the billet pushers. These latter are self-contained pushers, built by the American Sheet & Tin Plate Company in its roll and machine department and are located entirely outside of the furnace and have skid rails, upon which the billets are laid until the pusher is put in operation when, by means of heavy dogs driven by motor-driven gearing working in a rack, all the billets on the pusher and those in the furnace are forced to move ahead. The billets are fed into the furnace by these pushers through end doors and pass through the furnace on water cooled skid pipes, dropping out at the opposite end through doors on the roller tables which carry them to the mill to be rolled. The re-heating furnaces for the 14-in. and 18-in. merchant mills are of the recuperator type with chambers below the furnace, in which are placed cast iron U-pipes set into cast iron base castings. Through these recuperators the air for the furnace is forced by high pressure blowers. These furnaces have flat roofs set at an incline and composed of special fire brick tile resting on water cooled pipes which are supported by means of hangers. The furnaces are 17 ft. wide inside to accommodate billets 15 ft. long, the length of the furnaces being 46 ft. 6 in. The furnaces are heated with producer gas made in gas producers furnished by the Morgan Construction Company.

The 18-In. Mill

The 18-in. mill, Fig. 2, consists of seven stands of rolls—five two-high and two (Nos. 5 and 6) three-high. Trains 1 to 6 are driven by a 3200-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, running at 93.8 rev. per min., synchronous speed. The drive is effected by means of bevel gears. Train No. 7 is driven by a 650-hp. Westinghouse induction motor, three phase, 6600 volts, 3000 alternations per minute, running at 187.5 rev. per min., synchronous speed, this motor also driving by means of gearing the vertical roll stand which is used for edging flats when desired.

These stands of rolls are arranged so that the pieces being rolled will not be operated on by more than one stand of rolls at a time. This is accomplished by having a sufficient space between stands, with roller table to carry the pieces from one stand to the next. The roller tables are driven by General Electric Company mill type motors. The first four passes are through two-high mills and the fifth pass through a three-high mill, train No. 5. Coming out of the upper pass of train No. 5 the bar goes up an inclined chute equipped with rollers and returns through the lower pass running back to another three-high stand—No. 6—and then back towards the furnaces, when it is reversed in direction again. It now goes through the lower pass of train No. 6, and then on through the edging rolls if flat material (except when it is desired to edge the flats by turning them up and edging through some of the horizontal rolls) and through the ninth pass—train No. 7—and from there on out to the hot runout table of the cooling beds. The speeds of the bars through the various trains are as follows:

	Feet per minute.		Feet per minute.
Train No. 1	145.2	Train No. 6 (passes 7 and 8)	602.5
Train No. 2	187.8	Train No. 7 (the 9th pass)	748.0
Train No. 3	268.3		
Train No. 4	352.5		
Train No. 5 (passes 5 and 6)	521.0		

These speeds are based on the synchronous speed of the motor, the full load speeds of the motor being 91 rev. per min. for the 3200-hp. motor and 182 rev. per min. for the 650-hp. motor. The motor drive, mills and roller tables for the 18-in. mill were built at the Pencoyd works of the American Bridge Company, this company also providing the same equipment for the 14-in. and both 12-in. mills.

The cooling beds for the 18-in. and 14-in. merchant mills are flat beds about 150 ft. long, with a width from center to center of cold runout tables of 45 ft. 7 in., with rails for the rolled shapes to rest on, the bars being pushed off from the hot runout table by a long straight edge, which alternately pushes them to the sides of the cooling beds. After cooling they are carried over to the runout tables at the sides of the cooling beds by means of the cold pull dogs. When angles are being rolled, they are passed through roll straighteners and then pass on to the bar shears in the distributing building. When sections are being rolled which cannot be straightened in the angle straightening machines, the latter are pulled back out of the way to one side and the space they had occupied is filled with short tables. The bar shears in the distributing building are of the open type with 30-in. knives and about 3½-in. stroke, designed and built by the Morgan Construction Company. Following the bar shears are the 60-ft. gauge tables, also designed and built by the Morgan Construction Company. These have adjustable gauges for cutting the pieces to length. The pieces are then pushed off from the shear gauge tables into cradles alongside which are placed on two, 30-ft. platform scales of 30 tons capacity each, arranged so that stock 60 ft. long may be weighed as it is cut off. For channels, I-beams and any sections which cannot be sheared to advantage, provision is made for cutting them with cold saws which are located beyond the tables following the

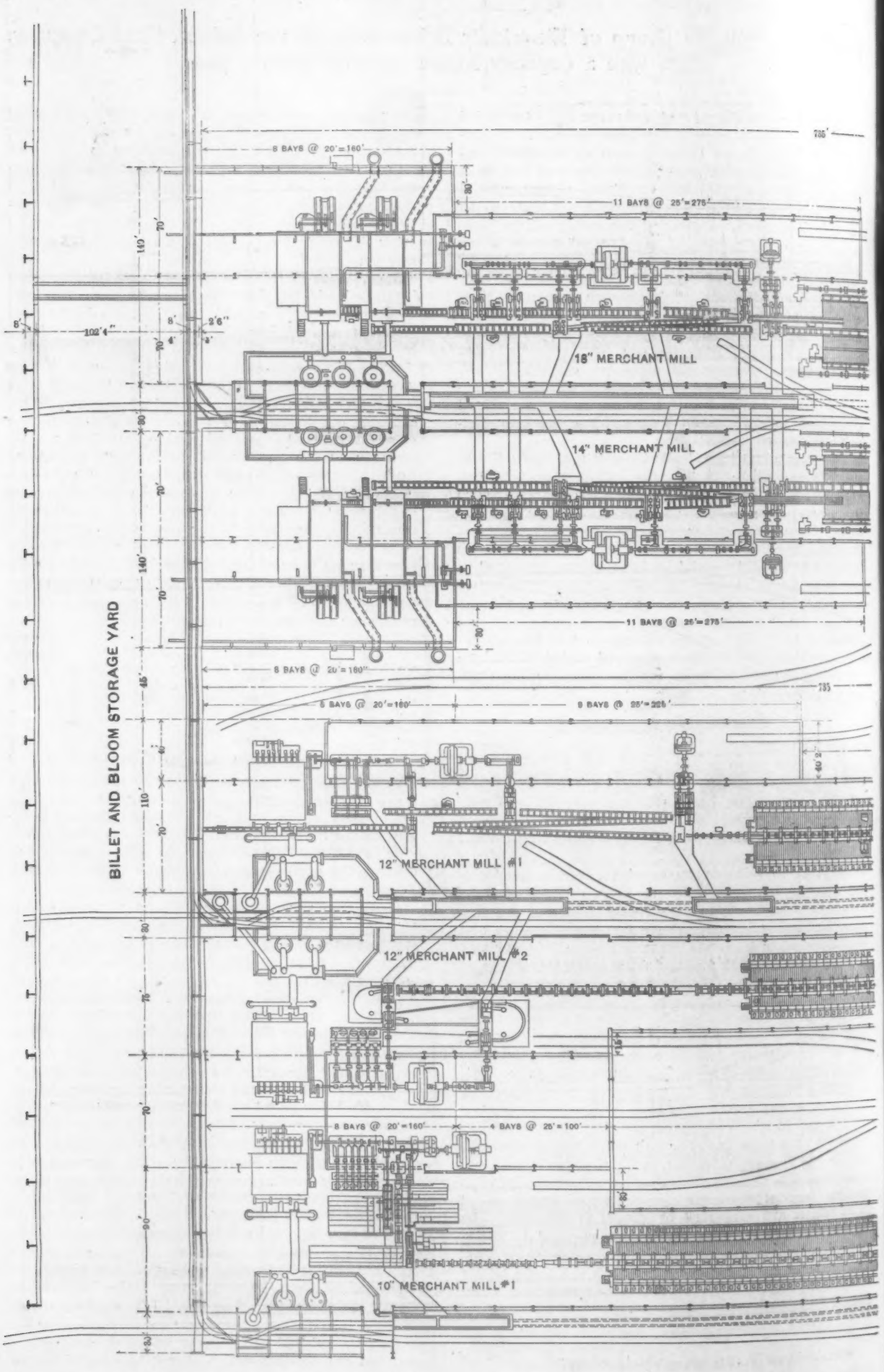
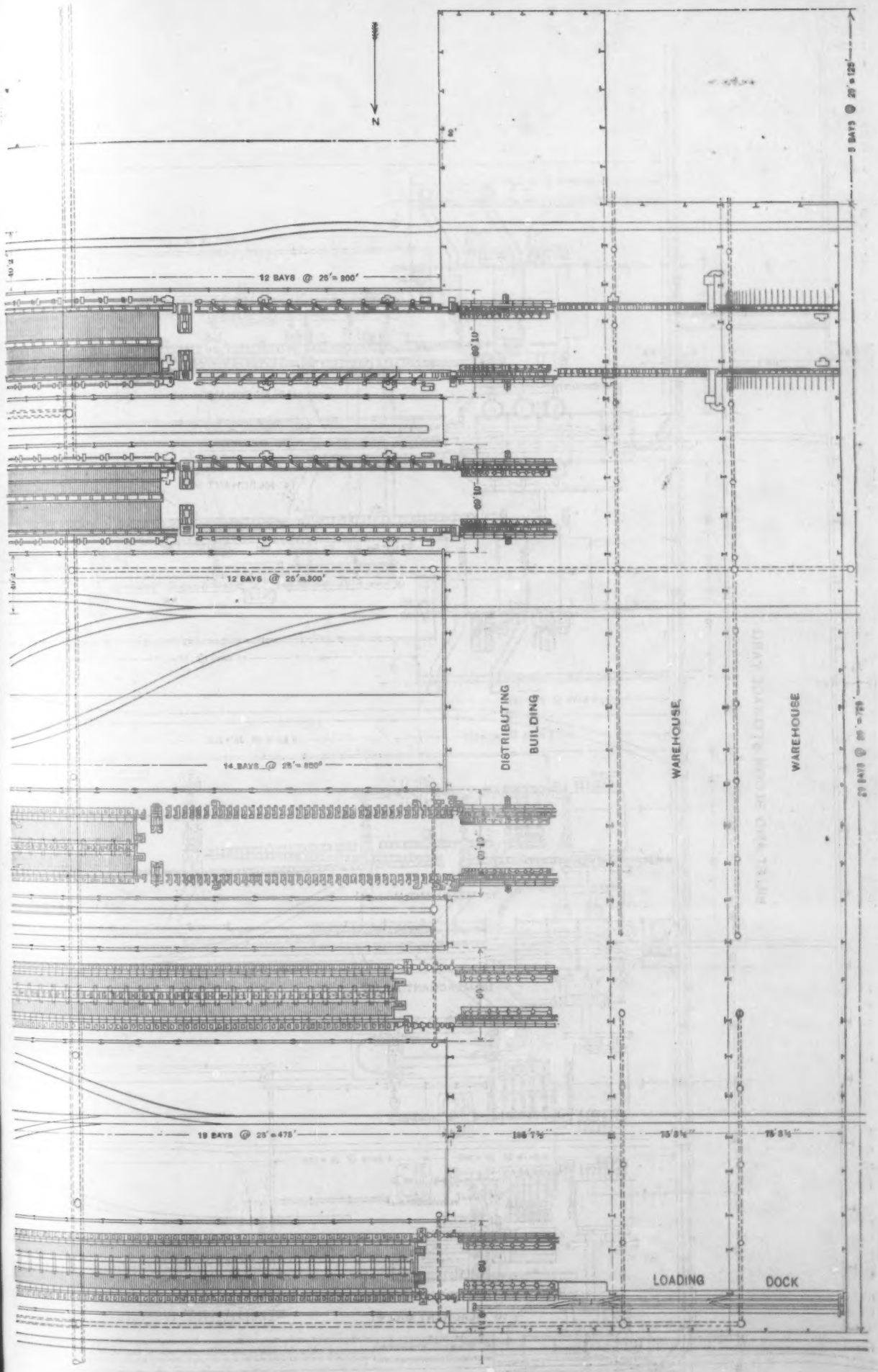


FIG. 1.—GENERAL PLAN OF THE FIVE NEW MERCHANT



MILLS OF THE INDIANA STEEL COMPANY, GARY, IND.

bar shear gauge tables. The 18-in. mill is served by a 30-ton crane, 36 ft. 6 in. span, in the motor room; one 20-ton crane, 66 ft. 6 in. span, in the main building, and one 10-ton crane, 42 ft span, for handling the billets in the furnace building—all furnished by the Alliance Machine Company.

14-In. Merchant Mill

The 14-in. mill, Fig. 3, is practically the same as the 18-in. mill, only the opposite hand to the 18-in. mill, and arranged to run on lighter sections. The speeds of the passes are somewhat different, being as follows:

	Feet per minute.		Feet per minute.
Train No. 1	140.8	Train No. 5	504.8
Train No. 2	199.3	Train No. 6	687.7
Train No. 3	270.7	Train No. 7	685.8
Train No. 4	343.9		

Motor speeds are the same as those for the 18-in. mill. In addition this mill is provided with straighteners designed and built by the Brightman Mfg. Company for straightening large round bars. The 14-in. mill is equipped with one 30-ton crane, 36-ft. 6-in. span, located in the motor room; one 20-ton crane, 66-ft. 6-in. span, located in the main mill building; one 10-ton crane, 42-ft. span, for handling the billets in the furnace building. A view of the latter is given in Fig. 4.

Fig. 2.—View in 18-In. Merchant Mill Looking from East End.

12-In. Merchant Mill, No. 1

The 12-in. mill No. 1 is arranged somewhat similar to the 18-in. mill as will be noted by an inspection of the drawing. In this case, however, the billets to be rolled are deposited upon double billet skids, Fig. 5, located in the billet and bloom storage yards, and as they are needed are pushed down on a roller table between the two sides of the billet skids. The roller tables between the billet skids delivering the billets to the side of the furnace were made by the United Engineering & Foundry Company, Pittsburgh. The billets are carried in through side doors in the furnace which is provided with water cooled rollers inside between the bars of the billet pusher. This billet pusher was built by the Morgan Engineering Company, Alliance, Ohio, and differs from those in the 14-in. and 18-in. mills in that, while the principal parts of the pusher are outside of the furnace the billets are forced ahead by means of rams or bars which pass through the end of the furnace between the water cooled rollers. The furnace for the 12-in. mill No. 1 has a width of 33 ft. to accommodate billets 30 ft. long. The inside length of the furnace is 34 ft. 11½ in. The roof of this furnace is unlike that of the furnaces of the 14-in. and 18-in. mills, being level instead of inclined. It is composed of special fire brick tile, supported by water cooled pipes similar to the 14-in. and 18-in. mills. These water cooled pipes are carried by means of hangers to a heavy supporting structure above the furnace. The roof structure is designed with an excess of strength so that it will not fail through weakening of the members on account of the heat of the furnace playing on the roof structure, causing the falling out of some of the roof tile.

The recuperator principle is adopted here the same as for the 14-in. and 18-in. furnaces, but the 12-in. mill furnaces have side doors at both ends instead of end doors. After the billets are pushed into the furnace on the water cooled rollers, they slide on water cooled skid pipes to the other end at which point the skid pipes are bent downward, going through the bed of the furnace. The billets slide over the curved ends of the skid pipe on a bed of fire brick at a slightly lower elevation than the skid pipes. A push bar between pinch rollers forces them far enough out on the mill side so that they enter another set of pinch rollers which drags them out of the furnace. On the mill side of the furnace there is located a small billet shear built by the Morgan Engineering Company, Alliance, Ohio, which is for the purpose of cutting the billets into shorter lengths than the full length at which they are handled in the furnace. This is done in order that the final product going through the mill will not be too long to be handled on the cooling bed when rolled into small sections. This billet shear is driven from the end of the motor drive shaft, and a clutch is thrown in whenever it is desired to make a cut. A similar billet shear is provided at the furnaces of the 12-in. mill No. 2 and the 10-in. mill No. 1. The motors driving the 12-in. merchant mill No. 1 consist of one 2000-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, running at 112 rev. per min., full load speed; and a 650-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, running at 182 rev. per min., full load speed. The first rolling operations are performed in a continuous mill of four stands of 14-in. rolls, following which there are two two-high stands of 12-in.

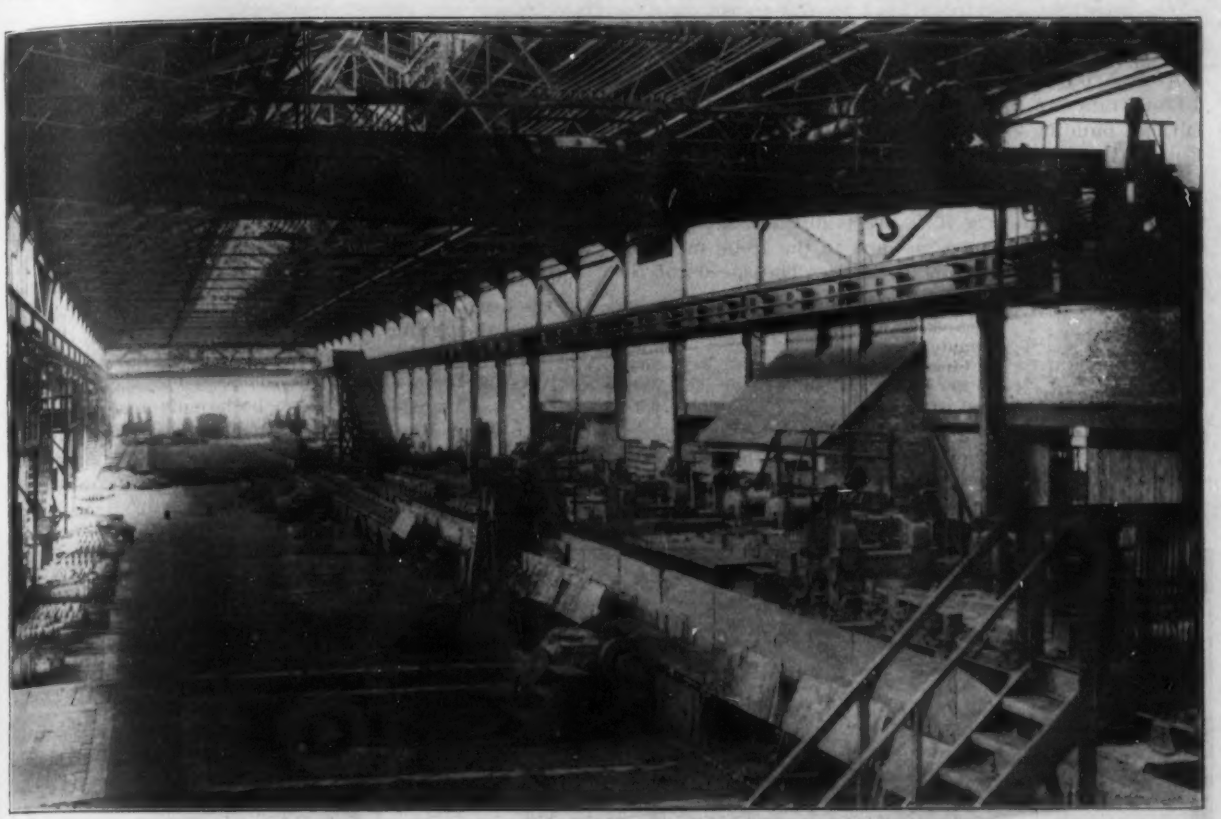


Fig. 3.—View in 14-In. Merchant Mill Looking from the East End.

rolls and one three-high stand of 12-in. rolls, driven by the 2000-hp. motor which also drives the continuous mill of four stands; and one two-high stand and one three-high stand which are driven by the 650-hp. motor. The speeds of the various passes are as follows:

	Feet per minute		Feet per minute.
Train No. 1	123.4	Train No. 6 (6th and 7th passes)	477.0
Train No. 2	175.5		
Train No. 3	230.5	Train No. 7 (8th and 9th passes)	671.5
Train No. 4	329.0		
Train No. 5	434.0	Train No. 8 (10th pass)	715.0

These speeds are based on the full load speed of the motor. The pieces being rolled in the sixth and seventh passes of train No. 6 go out on an elevated inclined chute fitted with motor-driven rollers, as is done in the 18-in. mill, and then go back alongside the furnace and up another inclined chute fitted with idle rollers. Returning they go through the ninth pass—train No. 7—and on through the tenth pass—train No. 8—and then on the hot runout table to the cooling bed. The cooling bed is flat, of the shuffle bar type, designed and built by the Morgan Construction Company. Its length is 180 ft. and the width from center to center of cold runout tables, 44 ft. 7 in. As the bars are shuffled off to the side of the cooling bed, assembling bars push them together so that several bars may be arranged side by side to go to the bar shears to be cut in multiple. The bar shears, gauge tables and cradles are similar to those in the 14-in. and 18-in. mills. The 12-in. mill is also provided, like the 14-in. mill, with angle bar straighteners, which may be pulled back out of the way and in their place may be put a bar straightener of the Brightman Mfg. Company's design for straightening rounds as is done in the 14-in. mill. The 12-in. mill No. 1 is served with one 30-ton crane, 36-ft. 6-in. span, located in the motor room; one 15-ton crane, 66-ft. 6-in. span, located in the main building, and one

Fig. 4.—East End of 14-In. Mill, Showing Heating Furnaces.

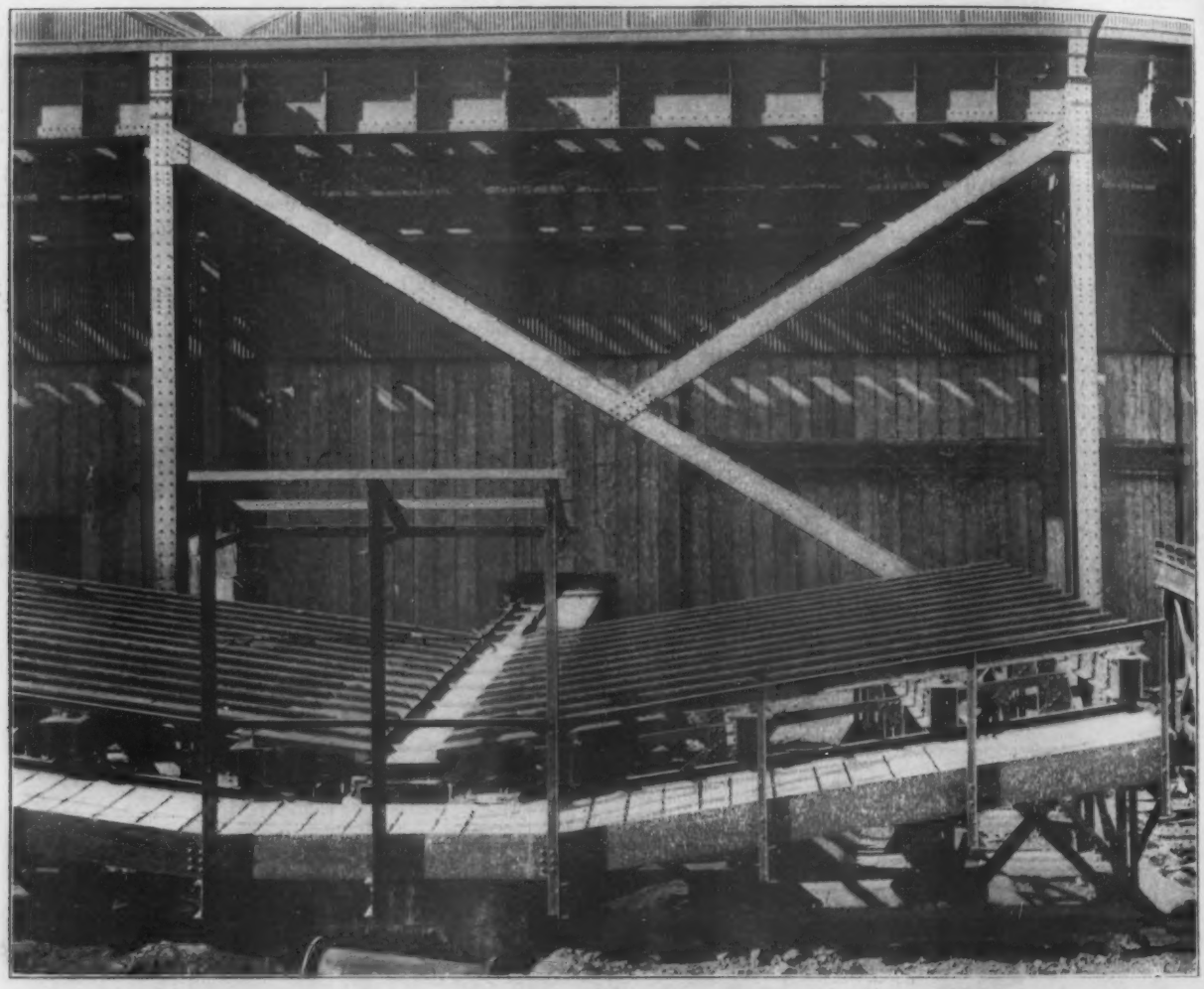


Fig. 5.—Yard Skids on Which Billets Are Pushed Down for Conveying to Heating Furnaces of 12-In. Merchant Mill No. 1. Similar Double Skids Are Provided for 12-In. Mill No. 2.

Fig. 6.—Cooling Beds, 12-In. Merchant Mill No. 2.

5-ton crane, 26-ft. 8-in. span, for handling the scale and ashes between the buildings of 12-in. mills Nos. 1 and 2.

12-In. Mill No. 2

The 12-in. merchant mill No. 2 differs from the 12-in. mill No. 1 in that it has two repeaters which are used instead of reversing the direction of the bars in the course of rolling. The furnace for the 12-in. mill No. 2 is the same as that for the 12-in. No. 1 mill, only built the opposite hand. The billets are fed to the furnace from billet skids in the billet and bloom storage yard in a manner similar to that in the No. 1 mill. The motor drive for the 12-in. mill No. 2 consists of one 2500-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, designed to run at two speeds, 92 rev. per min. and 113 rev. per min., full load speed.

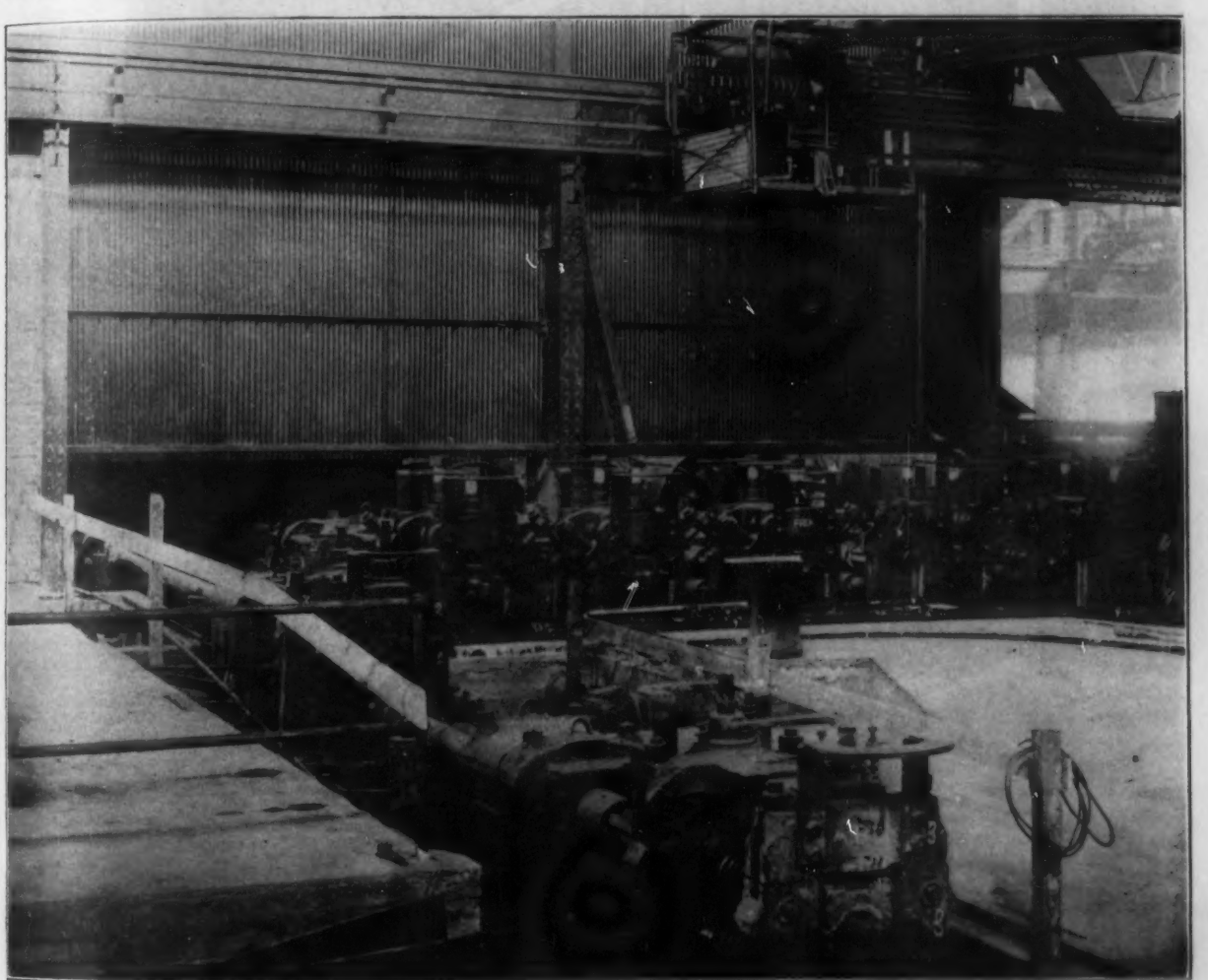


Fig. 7.—Main Rolls of 12-In. Merchant Mill No. 2.

The roughing train is a continuous mill consisting of five stands of 14-in. rolls, while the balance of the trains are fitted with 12-in. rolls. The main rolls are shown in Fig. 7. The bars after passing through the five roughing stands go to the sixth stand; then through the repeater to the seventh stand; back to the eighth stand; through the other repeater; then to the ninth stand and on the hot runout table leading to the cooling bed (Fig. 6), which is 350 ft. long and 36 ft. 3 in. wide from center to center of cold runout tables. It is of the same type as that in the 12-in. mill No. 1, designed and built by the Morgan Construction Company. From the cooling bed in 12-in. mill No. 2, the bars run out to similar bar shears and gauge tables to those following the No. 1 mill.

The 12-in. mill No. 2 is served by one 15-ton crane, 71-ft. 6-in. span in the main building and one 5-ton crane, 56-ft. 6-in. span, in the motor room between 12-in. mill No. 2 and 10-in. mill No. 1.

10-In. Mill No. 1

The 10-in. merchant mill No. 1 is partly a hand mill. The furnace is similar to those in 12-in. mills Nos. 1 and 2 except that it is shorter, being only 27 ft. 4 in. long, but handling the same length of billets, 30 ft. Instead of the billets being carried on water cooled rollers inside the furnace, there is a water jacketed pinch roller at the entrance to the furnace which forces the billets to slide lengthwise over water cooled skids between the bars of the pusher. The billets to be handled in this furnace will come from the billet skids in the billet and bloom storage yard, similar to those used at the 12-in. mills Nos. 1 and 2. The motor drive for 10-in. mill No. 1 consists of one 2000-hp. Westinghouse induction motor, three phase, 25 cycle, 6600 volts, 3000 alternations per minute, running at 133 rev. per min. and 162 rev. per min. full load speed. The roughing train is a continuous mill consisting of six stands of 12-in. rolls. The main rolls and the concrete runways are shown in Fig. 8. Following the roughing train, the bars go to the 10-in. trains between the looping floors 1, 2, 3, 4 and 5, for as many passes as are required for the section being rolled, after which they pass on to the hot runout table leading to the cooling bed, which for the 10-in. mill No. 1 is 450 ft. long and 36 ft. 3 in. wide, center to center of cold runout tables. This bed is also of the Morgan Construction Company's flat shuffle bar type, similar to that in the 12-in. mills Nos. 1 and 2. The 10-in. mill is also equipped with bar shears and gauge tables similar to those in the other merchant mills. The cutting off machine in this mill is shown in Fig. 9. The speeds of the bars through the various trains of the 10-in. mill No. 1 will be as follows, based on the full load speed of the motor driving the trains:

	Feet per minute.		Feet per minute.
Train No. 1	77.2 and 93.8	Trains Nos. 7 and 8	521.0 and 636.0
Train No. 2	101.4 and 120.6	Trains Nos. 9 and 10	672.5 and 822.0
Train No. 3	132.5 and 161.0	Trains Nos. 11 and 12	682.0 and 834.0
Train No. 4	198.5 and 248.0		
Train No. 5	273.8 and 333.5		
Train No. 6	406.0 and 494.0		

The 10-in. mill No. 1 is served by one 15-ton crane, 86-ft. 6-in. span in the main building, and one 5-ton crane, 56-ft. 6-in. span over the cooling beds. The motor drive,

Fig. 8.—View of Main Rolls of 10-In. Mill, Showing Concrete Runways

mills and looping floors for this mill were furnished by the United Engineering & Foundry Company of Pittsburgh.

Gas Producers

The furnaces for the 12-in. mills Nos. 1 and 2 and the 10-in. mill No. 1 are heated with producer gas made in gas producers furnished by the Wellman-Seaver-Morgan Company. Two producers are provided for each furnace. The coal for feeding the gas producers of all the merchant mills is transferred on an elevated coal track by narrow gauge dump cars of special design drawn by an electric locomotive, which brings the coal from the coal crushing and elevating plant south of the axle mill and deposits it in elevated coal bins alongside of the gas producers.

In all of the merchant mills the scale from the roll trains is washed away from the mills in scale trenches to scale pits which are outside of the buildings, from which the scale is removed by means of bucket cranes over the scale pits and placed on cars.

All of the large motors driving the trains of the merchant mills are placed in separate motor rooms to remove them from the mill dust, the electrical controlling apparatus being installed in the same motor rooms. An elaborate system of railroad tracks is provided for entering all mills for the purpose of handling the billets to be rolled and the finished product, also machinery needed for repairs or replacements.

Warehouses and Distributing Buildings

In the warehouses and distributing building at the end of the 10-in. mill there is provided a loading dock with small narrow gauge cars running on tracks elevated to the level of standard gauge car platforms. This loading dock is for the purpose of loading box cars with small material. The warehouses are equipped with several bar shears and straighteners for making up orders of short stock, regardless of the mill in which it is rolled. These are placed in various parts of the warehouses and distributing building to facilitate the handling of material. The distributing building and the warehouse are not for the laying up of stocks of material to be cut for miscellaneous orders so much as they are intended to be an avenue of distribution for the mill products that will enable the prompt delivery to freight cars of all material rolled as fast as the mills turn it out. Only that material

Fig. 9.—Cutting-off Machine in 10-In. Mill.

will be allowed to remain on hand in the warehouses which is being held for carload shipments or the overrolling of an order giving an excess production of that particular stock.

Tie Plate Department

At the south end of the distributing building there is an extension which is used for the cutting and punching of tie plates. This is arranged with skids for receiving the bars from the mill and is provided with four combination punches and shears, designed and built by the Long & Allstatter Company, Hamilton, Ohio. These are arranged to punch one tie plate at the same time cutting off another one which has been punched, thereby making a tie plate complete at one stroke of the machine. The distributing building is equipped with five 20-ton cranes, 102-ft. span, and the warehouses are each equipped with two 10-ton cranes, 71-ft. 9-in-span.

A New Charcoal Pig Iron for Chilled Car Wheels

A recent pamphlet of the Superior Charcoal Iron Company, Grand Rapids, Mich., is devoted to that company's Special charcoal pig iron and its uses, particularly in the manufacture of high grade cast iron car wheels and of chilled rolls. The results from the use of Lake Superior charcoal iron in car wheels in the period of 1870-1885 are referred to in a discussion of the present day demand for a car wheel of cast iron that will stand all conditions of service under 100,000-lb. capacity cars. The company set out to produce charcoal iron which would be not only like that of the early days but be able to carry the scrap wheel of to-day, "a scrap wheel inferior in quality to the scrap wheel of 1880, which was made almost entirely from charcoal iron." The result of the experiments is the Special charcoal pig iron now made at Marquette, Pioneer, Excelsior and Antrim furnaces in Michigan. In the chilling grades this iron is spoken of as very uniformly close grained in structure and of fine grained chilling quality. The grades No. 3 and 4 give transverse tests from 22,000 to 28,000 lb. on a 2-in. square bar broken 12 in. between supports, and tensile tests from 30,000 to 38,000 lb. per square inch, according to grade. The grading card of these irons is as follows:

Non-Chilling Open Grain Iron.

	Silicon.		
Grade.	Minimum. Per cent.	Average. Per cent.	Maximum. Per cent.
A Scotch	2.38 and over.		
B Scotch	2.13	2.25	2.37
C Scotch	1.88	2.00	2.12
Low 1	1.63	1.75	1.87
High 1	1.38	1.50	1.62
Low 2	1.13	1.25	1.37
High 2	0.75	1.00	1.12

Chilling Close-Grained Iron.

	Approximate average.	
Grade.	Chill.	Silicon. Per cent.
Low 3	Trace to ¼ in.	0.75
High 3	¼ to ⅝ in.	0.56
Low 4	⅝ to 1 in.	0.44
High 4	1 to 1½ in.	0.35
Low 5	Low mottled	0.25
High 5	High mottled	0.15
6	Clear white	0.10
Phosphorus		0.15 to 0.22
Manganese		0.20 to 0.60
Sulphur		0.015 to 0.025

Phosphorus in higher percentage can be supplied if desired.

While the chilling irons are graded entirely by fracture grain and chill, chemical analysis is made on each shipment, the phosphorus, manganese, silicon and sulphur content being marked on each invoice. The company makes the following observations as to the use of manganese in car wheel manufacture and the ends aimed at in the production of its Special pig iron:

Up to the year 1880 the use of manganese had never occupied any particular place in car wheel practice except as it was found in charcoal pig iron. As previously stated, it took some years to bring the use of ferromanganese into general practice, but, as this increased from year to year, together with the elimination of charcoal iron from many wheel mixtures, its influence became more and more apparent, its effect being more in evidence after the introduction of 50-ton capacity cars, and which exercised a powerful influence on the life of the chilled wheel.

The effect of the use of ferromanganese on the crystalline structure is very marked, particularly when in combination with high proportion of other elements; high sulphur with manganese effecting a combination which produces a coarse chilled crystallization, which can be readily separated under distinct lines of cleavage, and which, under excessive heating and cooling due to brake service, causes cracking and disintegration of tread and flange.

The strength of the ordinary cast iron wheel of to-day is dependent entirely on the use of ferromanganese, and with its use there is no difficulty in meeting the "M. C. B." Specifications of "drop" and "thermal" tests. But while strength can be maintained with the use of ferromanganese, its effect on chill structure becomes more marked with every re-melt, so that it is safe to say that with the present method of manufacture the cast iron car wheel is deteriorating in quality, and, if this is continued, it will undoubtedly lead to the point where it will pass out of use for heavy equipment. If the railroads wish to establish the very best cast iron wheel for heavy equipment, something more must be done than adhere to the "M. C. B. Specification" and the lowest competitive price. In the manufacture of Special pig iron, its strength is obtained with manganese reduced to a minimum, and with its fine chill structure, in which the cleavage feature is also reduced to a minimum, it is possible, with a good percentage of this iron and selected old wheels that have stood service, to produce wheels of sufficient strength to greatly exceed all required tests without the use of ferromanganese, and establish the fine, well knit chill structure that will stand service. But it must be obvious that wheels made in this way will cost more than the ferro-made product.

For a number of years the opinion was quite general there was not sufficient high grade charcoal iron available to change the method of making wheels. This opinion is not warranted by the facts. If demand is made upon charcoal iron makers for the high quality indicated in Special iron, to the extent of breaking away from the "ferro" wheel for heavy equipment, the railroads will find them equal to the occasion; as with the vast iron ore resources of Lake Superior and the immense tracts of cordwood lands in absolute control, the Special iron can be supplied in quantity to meet such demand for many years to come. The manufacture of Special charcoal pig iron calls for high order of furnace management; a careful selection and preparation of uniform ores; the reconstruction of furnace lines and a radical change in furnace manipulation.

Special iron is also brought to the attention of chilled roll makers, as being high grade material for their product. The general reduction in the production of cold blast irons, and the diminishing production of Southern charcoal pig iron, must soon make it necessary for roll makers to look for such material elsewhere.

For the manufacture of gas and steam cylinders the close grained structure of Special iron will produce dense castings of medium hardness that will machine to a fine finish. Also in ordinary foundry mixtures where additional strength is desired without disturbing the usual mixture, we recommend the use of our Special irons.

The Keystone Steel Casting Company.—This company succeeds the Keystone Steel Foundry Company, Avonmore, Pa., and is capitalized at $700,000, equally divided into preferred and common stock. A good working capital is thereby provided. Charles Biehl, Tarentum, Pa., is president; John Sauers, North Side, Pittsburgh, vice-president; and John Wellersbacher, Pittsburgh, treasurer. The concern makes a specialty of steel castings from one pound to 10 tons, and caters directly to the requirements of the Government and of mills, in which lines its castings have proved highly satisfactory. The company maintains a sales office at 431 Frick Building, Pittsburgh, and one in Washington, D. C., the latter in charge of W. S. Bishop. Improvements, including the erection of an additional acid open hearth furnace, are contemplated at a little later date. The present buildings and floor space are sufficient for its immediate needs.

Hubbard & Co., Pittsburg, manufacturers of railroad track tools, shovels, scoops, pole line material and Peirce brackets, will show their complete line of goods in booths 197-198 at the exhibit of the Railway Appliances Association to be held in the Coliseum, Chicago, March 20 to 25 inclusive. This exhibit is given in connection with the convention of the American Railway Engineering & Maintenance of Way Association. Hubbard & Co. will be represented by R. L. Mason, Jr., C. L. Peirse, Jr., B. S. Haudwork and J. A. McLaughlin, Jr.

The Scott Iron & Steel Company, Pittsburgh, has increased its capital stock from $100,000 to $750,000.

American Rolling Mill Equipment of Hagan Furnaces

The American Rolling Mill Company, Middletown and Zanesville, Ohio, has awarded to George J. Hagan, furnace engineer, Pittsburgh, Pa., the contract to erect all of its sheet and pair furnaces, jobbing mill furnaces and annealing furnaces that constitute a large department of its new East Works, now being constructed at Middletown at a cost of about $4,000,000. The company aims to make this plant the best of its kind in the world. No pains or expense is spared in installing machinery and furnaces that will not only maintain but still further improve the already high standard of American Ingot iron which the American Rolling Mill Company has the enviable reputation of making.

After exhaustive experiments with the American underfeed stoker at the company's Zanesville plant and careful observation of the working of this stoker at several other plants having it in successful operation, the American Rolling Mill Company decided to adopt it as the best means of heating its new sheet and pair furnaces, in which an even temperature and absence of scale are the ruling desiderata. Reduced consumption of fuel per ton of metal heated also influenced the installation of the American underfeed stoker.

The Allis continuous pair heating furnaces being installed will heat 25 per cent. of the high grade ingot iron bars rolled into sheets at the new East Works. The Allis improved hearth not only constitutes a thoroughly practical means of heating sheet bars continuously, which are charged at one end of the furnace and drawn at the other, but it also may be used to great advantage in ordinary hand manipulated pair heating furnaces, as it increases their hearth capacity about two and one-half times, which enables the bars to be thoroughly and evenly heated at sheet furnace temperatures and consequently without scaling.

The Damascus Bronze Company, Pittsburgh, Pa., is now extensively manufacturing copper containing 5, 10 and 15 per cent phosphorus. This product is made by very few concerns, and consumers will no doubt be glad to know of the above-named source of supply. The company has recently opened offices in room 506 Franklin Bank Building, Philadelphia, in charge of Maurice Joy, the territory to include the entire East. It also maintains offices in room 42 Tood Building, Louisville, Ky., in charge of the Chandler & Burgy Company.

Making Duplicate Automobile Parts

Some Uses of Potter & Johnston Automatic Machines for This Work

The extensive production of automobiles during the past few years has practically revolutionized the methods employed in manufacturing small gas engines. Formerly the standard line of machine tools was employed for this purpose, but now special machinery for finishing each part is demanded. The manufacturers find that employing machinery of this type not only for finishing small parts such as screws, bolts, nuts, studs, &c., but also for all classes of duplicate parts, both large and small, made from castings, drop forgings or material cut from large bar stock and parts drawn from sheet metal where a final finish is desired on some surfaces results in not only maintaining the extreme accuracy required of this class of work but at the same time reduces the production costs to a minimum.

Another feature which has made it possible to employ automatic machinery so extensively for finishing this class of work are the great improvements made in foundry practice during the past few years that have resulted in the production of castings which were uniform both as regards quality and size. Owing to imperfections in castings and drop forgings it was not possible a few years ago to realize all the advantages resulting from the use of automatic machinery. When nickel and other alloy steels were first adopted for automobile use drop forgings made from these materials were not uniform and considerable variation in the hardness of the material was found in different parts of the same forging. The combined efforts of the steel manufacturers and the producers of drop forgings have practically overcome this difficulty and it is now possible to obtain drop forgings which conform exactly to the purchaser's analysis and that are uniform throughout when properly treated.

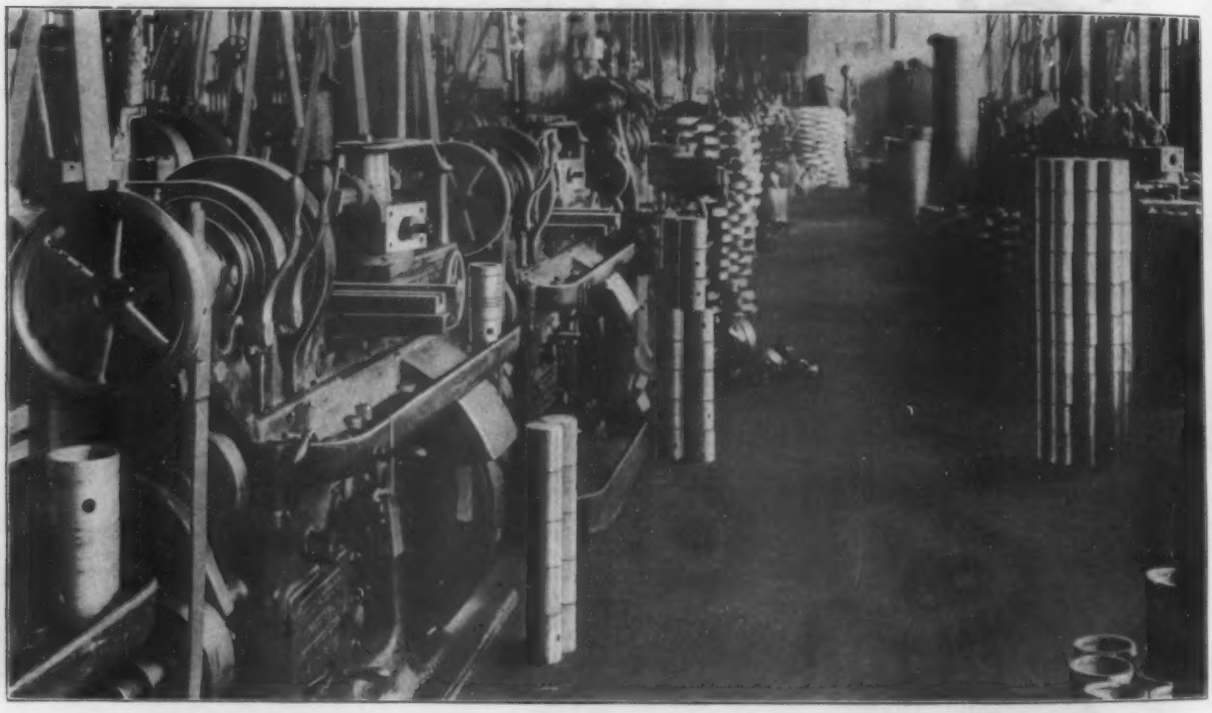


Fig. 1.—View in the Plant of the E-M-F Company, Showing the Special Automatic Machines Built by the Potter & Johnston Machine Company, Pawtucket, R. I.

In a large number of automobile plants automatic and special machines are used exclusively for the production of duplicate parts. A portion of one of these plants at Detroit, Mich., the No. 1 plant of the E-M-F Company, is shown in Fig. 1. In the foreground can be seen some special automatic machines built by the Potter & Johnston Machine Company, Pawtucket, R. I., which are used exclusively for finishing pistons, several machines operating on this class of work alone. The special automatic machinery shown in the background is employed

for finishing fly wheels, brake shoes, piston rings, clutch parts, and gears of all kinds and views of the machines performing these operations are given in the remaining engravings. A cast iron fly wheel is being finished in Fig. 2; in Fig. 3 oil grooves and those for the oil rings are being cut in a piston and a piston ring is being machined in Fig. 4. Figs. 5 and 6 illustrate two operations upon clutch parts, Fig. 5, showing the rim of a clutch cone being tapered while Fig. 6 illustrates the operation of machining the drop forged hubs.

The automatic machine illustrated in Fig. 2 was especially designed for finishing the cast iron fly wheels of the smaller sizes of gas engines. A three-jaw chuck is used to hold the casting and as the gripping is done inside the rim, the wheel is completely finished at one chucking, which insures all the finished surfaces being concentric. The plan of using several cutting tools simultaneously enables work to be produced in a very short time. One of the special features of this machine is not brought out in the engraving. This is a facing and counterboring tool which operates automatically through the hollow spindle and finishes the side of the hub adjacent to the chuck.

An automatic machine which is especially adapted for finishing pistons is shown in Fig. 3. Before being brought to this machine, the open or crank end of the piston is faced and bored and the hole for the pin drilled. A special holding device mounted on the spindle supports the piston and the entire surface, including the grooves for the oiling rings and those for distributing the lubricant itself is finished. While this is being done the head end of the piston is being centered and when the piece leaves this machine it is ready to be mounted on the centers of a grinder for the final finishing.

Piston rings are now made from a sleeve casting having sufficient length for a number of them to be cut from one piece and a flange at one end for chucking. For finishing the rings an interesting machine of the type illustrated in Fig. 4 is extensively employed. The casting is held in an ordinary three-jaw chuck and the turning tools used are mounted on a turret. When eccentric rings are being finished this tool receives a motion of that nature which is transmitted to the spindle shaft by an arm carrying a roller running on an eccentric ring on the outside of the chuck. The turret also supports the boring bar, which is piloted by a bushing carried in the chuck, this being an efficient and rigid arrangement. In operation this machine is entirely automatic and the rings are completely finished, even to marking the thin point where each ring is afterward split. The step tools for cutting the rings off are brought into action when the boring and the turning has proceeded a short distance so that practically all the finishing tools are in operation simultaneously.

The method of finishing an aluminum clutch cone is shown in Fig. 5. This part has a tapered rim which when brought into action fits around the fly wheel that is attached directly to the shaft of the motor. A taper turning tool mounted directly on the cross slide is used instead of adopting the somewhat cumbersome form of taper turning tool generally employed on turret lathes for finishing work of this character. The cutting tool is fed by an arm attached directly to the turret and the spindle revolves at the high rate of speed necessary for rapid production on aluminum.

The machine shown in Fig. 6, which is employed for finishing drop forged clutch hubs, is not especially novel. At the same time the part is not large and a number of tools mounted on the cross slide and the turret are cutting simultaneously. This feature, coupled with the automatic speed changes provided, gives the rapid production rate which is desired by manufacturers.

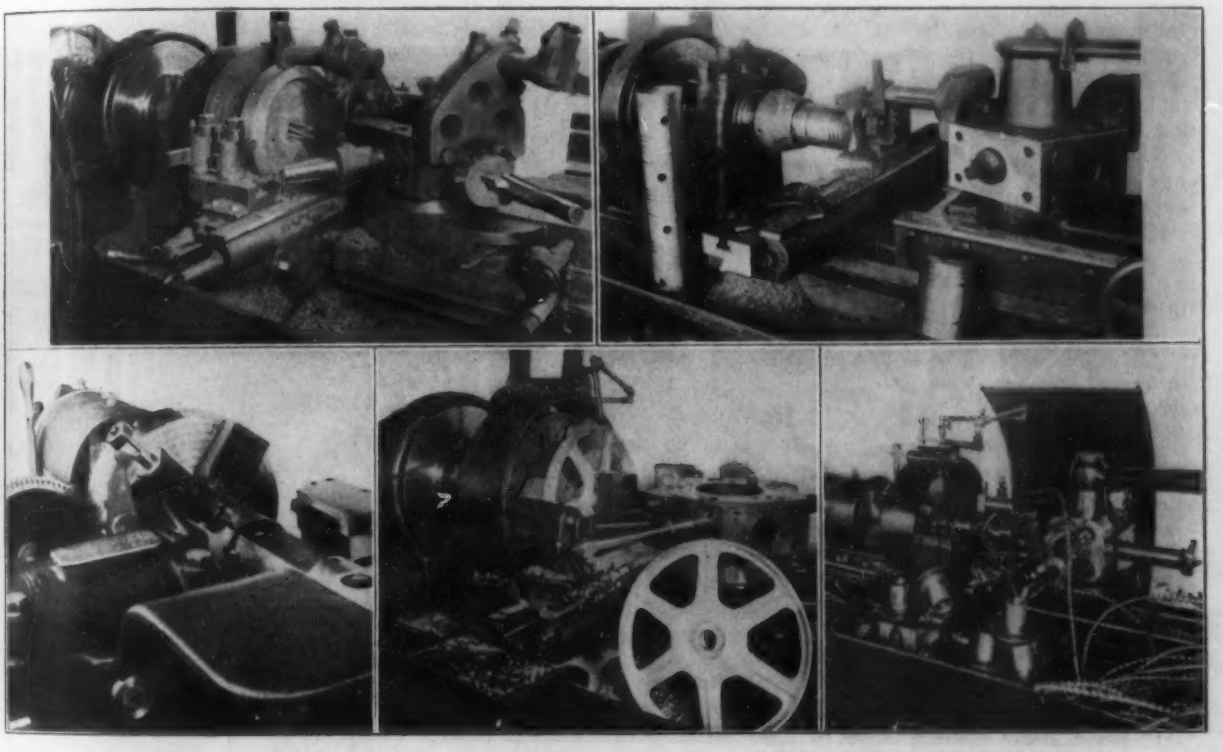


Fig. 2.—Finishing Flywheels. Fig. 3.—Cutting Grooves in a Piston.
Fig. 4.—Finishing a Piston Ring. Fig. 5.—Tapering a Clutch Cone Rim. Fig. 6.—Machining Clutch Hubs.

ADAPTATIONS OF THE AUTOMATIC MACHINE FOR FINISHING VARIOUS AUTOMOBILE PARTS

The George V. Cresson Company's Affairs.—Charles H. Moyer, manager of the New York office of the George V. Cresson Company, Philadelphia, and Charles G. Buchanan have been appointed receivers for the interests of the company in New York City. Webster King Wetherill, the receiver for the company in Philadelphia, will continue the business until its affairs are straightened out. The receivers have found the business in fairly good shape. The company was organized with a capital stock of $1,000,000, of which $306,800 in preferred stock and $500,000 in common stock have been issued. The assets are $1,327,270, against which there are liabilities of $516,100, including a mortgage of $175,000.

The Chamber of Commerce of Guthrie, Okla., is negotiating with a number of manufacturing concerns for the removal of their factories to that place, and has recently organized a company for the purpose of drilling for oil and gas which expects to commence operations within the next three mo

Mechanical and Civil Engineers,
PITTSBURGH, PA.

Iron Mining Beyond the Arctic Circle

CONCENTRATING AND BRIQUETTING OPERATIONS IN THE SYDVARANGER DISTRICT IN NORTHERN NORWAY

An Output of 1,000,000 Tons a Year—Details of a Vast Undertaking Employing in Part American Machinery

BY N. V. HANSELL.*

Away north on the shore of the Arctic Ocean, where until recently only a few dilapidated huts of fishermen existed and where the great stillness of the Arctic night seldom was broken unless it were by the raging snowstorms—there one of the most gigantic iron mining undertakings of the world will soon have modified the whole appearance of the country. It was, perhaps, a trading post to which Laplanders from the inland fjelds came with their herds of reindeer or where a whaling schooner would seek refuge; otherwise, it rarely had communication with the outside world.

The change has come quickly. In 1902 exploration parties prospecting for copper discovered vast iron ore deposits on the peninsula between the two fjord arms at Sydvaranger. The place is in the northern extremity of Norway. In 1904 Aktieselskabet Sydvaranger was formed to exploit the deposits; and when in 1910 operations were started Kirkenes, which is the new town at Sydvaranger, 5 miles distant from the mines, was already a thrifty community with 3000 inhabitants, electric light, excellent water and sewerage systems, a hotel and a number of stores, with mail steamer service twice weekly.

Location and Climatic Conditions

The only ways of reaching Sydvaranger are by one of these steamers from one of the more southerly ports of Norway or by railroad through Sweden to Narvik, the shipping port of the Kiruna ore of Sweden. From Narvik it takes four days and four nights to reach Sydvaranger, the journey carrying one through the characteristic Norwegian scenery of fjords and fjelds. On the last day of the voyage the steamer circles North Cape.

Although Sydvaranger is at so high a latitude as 69 degrees 40 minutes—not less than 220 miles north of the Arctic Circle—the climate does not impose as great hardships on the inhabitants as would be supposed. The Gulf Stream, which circles northern Norway, makes navigation possible all the year round, although it might freeze in the fjords. Against emergency the mining company keeps two ice breakers; this chiefly to satisfy the steamship companies. The monthly average temperatures are given below:

	Deg. F.		Deg. F.
January	13	July	52.7
February	10.4	August	52.5
March	17.8	September	43.8
April	28	October	31.8
May	36	November	22
June	46	December	13.3

It can be seen that the average temperature is below freezing point during seven months of the year; but it only occasionally drops as low as 30 or 40 degrees below zero. Vegetation is, of course, very sparse. Rugged birches, growing low and bushy, are nearly the only representatives of the tree group. The country is most desolate. Agriculture is impossible, and the few natives are either fishermen or nomadic Laps.

Ore Occurrence

The whole territory is covered by old eruptive rocks, chiefly granites and gabbros, which have been pressed and folded so that they are partly metamorphosed and everywhere have a stratified gneissic appearance. The ore occurs in this granitic gneiss in numerous lens-shaped layers, with the same strike and dip as the surrounding country rock, the ore bearing territory being limited to a zone about 8 miles long in general direction from north to south and 1 to 3 miles wide. The relative locations of the various ore deposits can be seen on Fig. 1. Some of them, especially in the northern end of the field north of the little lake, Björnevand, Fig. 2, are very large—1

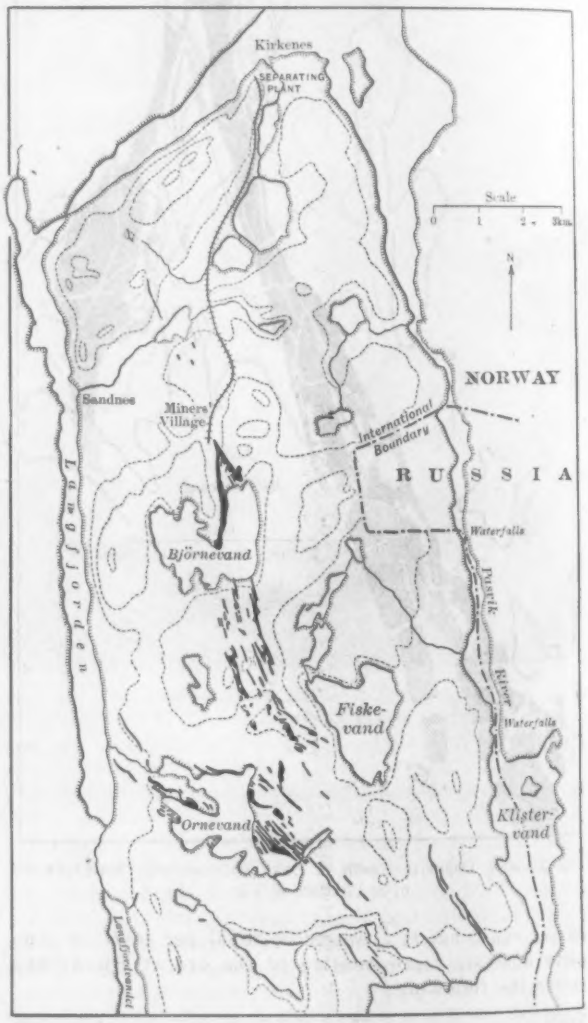


Fig. 1.—Map of the Sydvaranger Iron Ore District. Black Patches Represent Ore Deposits.

mile in length by 600 ft. in their widest parts. From this size there are all gradations down to small lenses only a few feet long. Generally the dip is very steep, being 60 to 70 degrees from the horizon.

The ore is of banded structure, consisting of narrow layers alternately high and low in iron. The richer layers consist of magnetite with some quartz and hornblende, the leaner ones of quartz with some magnetite and hornblende, Fig. 3. The banded structure is also characterized by intensive folding of the layers, Fig. 4. Here and there the ore bodies are cut by dykes of diabase or granite.

From Vogt's description of the ore occurrence most of

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these notes of the geology of the field have been taken, as the snow on the ground at the time of the writer's visit prevented any examination by him. Vogt is of the opinion that the ore bodies were formed by magmatic differentiation, and that therefore some of the larger ones, which at the surface are from ½ to 1 mile long, continue to great depth, with practically the same cross section.

The ore bodies have offered greater resistance to erosion than the wall rock, and therefore generally appear in the terrain as long ridges, higher where the ore bodies are wider. For instance, the eastern branch of the V-shaped one at Lake Björnevand, Fig. 2, rises 250 ft. over the lake level, or about 500 ft. above tidewater.

The iron percentage of the ore varies between 30 and

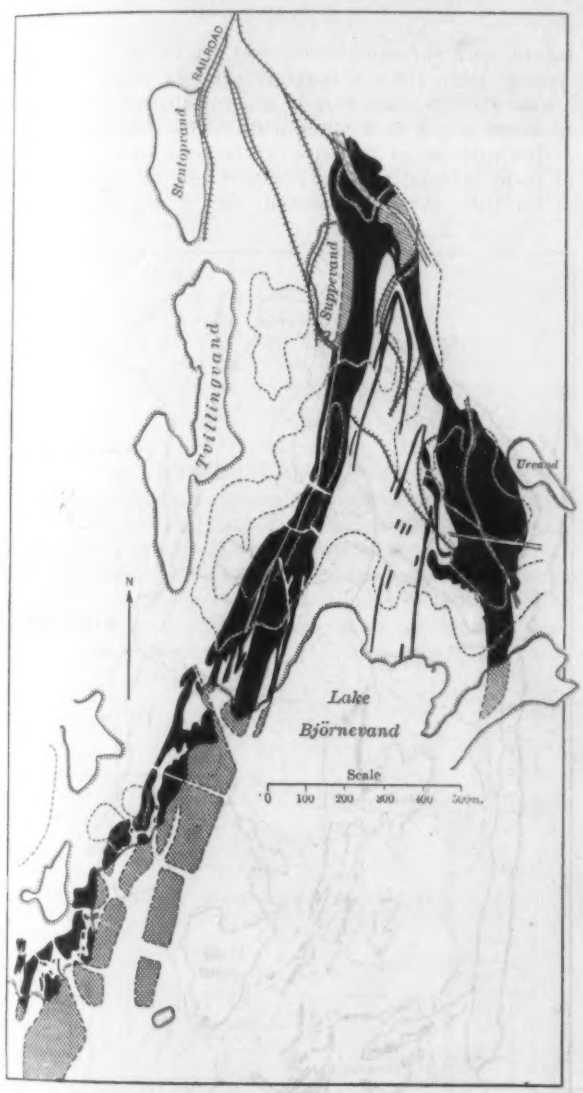


Fig. 2.—Ore Deposits North of Lake Björnevand. Enlargement of a Portion of Fig. 1.

38 per cent., but it averages 35 to 37 per cent. A complete analysis representative of the ore at Björnevand shows the following:

Fe_2O_3	36.71	TiO_2	0.08
FeO	15.40	P_2O_5	0.07
SiO_2	43.92	S	0.04
Al_2O_3	0.83		
MnO	0.58	Total	99.23
MgO	1.12	Fe	37.68
CaO	0.48		

Extent of Ore Deposits

To begin with, the deposits north of Björnevand are being exploited. These are of tremendous dimensions, varying in thickness from 175 to 600 ft., the average probably being 300 ft. The ore area of this part of the field is calculated to be not less than 400,000 sq. yd., of which, however, 120,000 sq. yd. is covered by Lake Björnevand. By magnetometric survey the outlines of the deposit have been well defined. In due course Björnevand will be drained by a tunnel to the fjord, so there is no reason not to include that part of the deposit in the calculations. Probably over 40,000,000 tons can be excavated in open cut before it will be necessary to resort to underground mining. To the tidewater level the estimated amount of available ore is 400,000,000 tons.

In the southern part of the field at Lake Ornevand are a number of lenses of ore of higher iron content—52 to 53 per cent. Fe. To a depth of 600 ft. it is estimated that

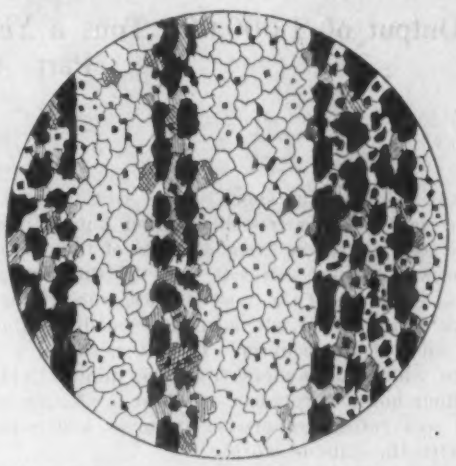


Fig. 3.—Microsection of Sydvaranger Ore, Magnified 25 Diameters Black, Magnetite; Shaded, Hornblende; White, Quartz.

at least 4,000,000 tons of this high class ore can be mined. The distance here from the main part of the field is nearly 6 miles. It is the intention to leave this ore intact for the time being.

Mine and Mine Equipment

A general view of the Sydvaranger field is given in Fig. 5. The quarry is laid out in benches 65 ft. in hight, two of which have been opened; 3¼-in. Ingersoll rock drills are used. The broken ore is loaded by two 90-ton Marion steam shovels on flat cars with loose 10-ton buckets of the Edison system. Fireless locomotives haul the ore to the preliminary coarse crushing plant, which is about 2000 ft. from the nearest opening. At intervals

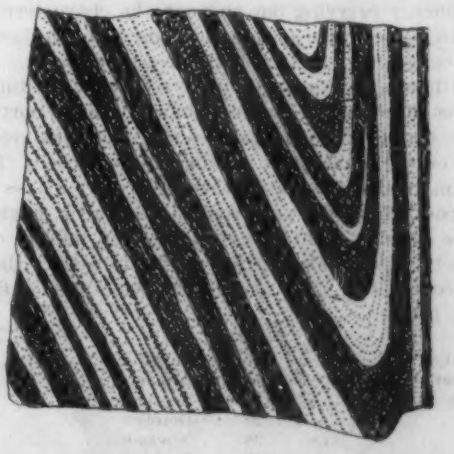


Fig. 4.—Folding of Layers of Magnetite and Quartz.

the locomotives are charged from a stationary boiler plant with steam of 200 lb. pressure. With one charging they will run 21 miles. Their weight empty is 21 tons, and in operation, when the boiler is half filled with hot water, they weigh about 30 tons. The advantage in their use lies chiefly in the possibility of using cheap coal under the stationary boiler, which is of Babcock & Wilcox make, furnished with mechanical stoker. Locomotive coal at this distance from coal producing centers costs 75 to 80 per cent. more than the boiler coal they are employing. The train crew consists of only two men, the engineer and one brakeman.

At the mine's crushing plant the preliminary crushing of the ore takes place. At present there is installed here only one No. 18 gyratory crusher of Allis-Chalmers make. This is giving very satisfactory service, crushing the ore

Fig. 5.—General View of Sydvaranger Ore Field North of Lake Björnevand, Showing Crushing Plant and Ore Bins. Machine Shop on the Left.

down to 10 in. or less. The only fault that could be found with it was said to be that it would not take the largest pieces that the steam shovel could load, the receiving opening being only 36 in. in width, and therefore some bulldozing has to be done—an expensive operation in a large quarry.* The crusher is mounted on a concrete base in the bottom of a shaft sunk in the rock for this purpose. It is driven by a 250-hp. motor. At full operating load the ammeter indicates that 160 to 170 hp. are consumed. Fig. 6 shows the general arrangement. The crushed ore is transported on a 36-in. conveying belt through an inclined tunnel to a series of bins at the side of the hill, inside which is the crushing plant. The total capacity of the bins is 4000 tons. By means of a cross conveyor leading over their tops and an automatic movable tipper they can all be well filled. The bins have for their base the solid rock. Six 45-ton railroad cars can be loaded at the same time.

The railroad to the separating plant at Kirkenes is very well equipped with modern 40-ton locomotives and 45-ton steel cars with hopper bottoms. The track is standard broad gauge. The grade to the separating plant is very favorable, with a drop of 56 ft. in the distance of 5 miles.

Concentrating and Briquetting Plant

Fig. 7 gives a view of the concentrating and briquetting buildings. They are on a side hill not far from the fjord. The plant is laid out in every detail according to the Gröndal wet system, and, being the latest and largest of the kind, it is going to serve as a model for many to be built elsewhere. It is constructed in a very substantial way; consideration of cost has been secondary.

* Since this crusher was bought and installed, others of the same type with greatly increased receiving openings have been constructed.

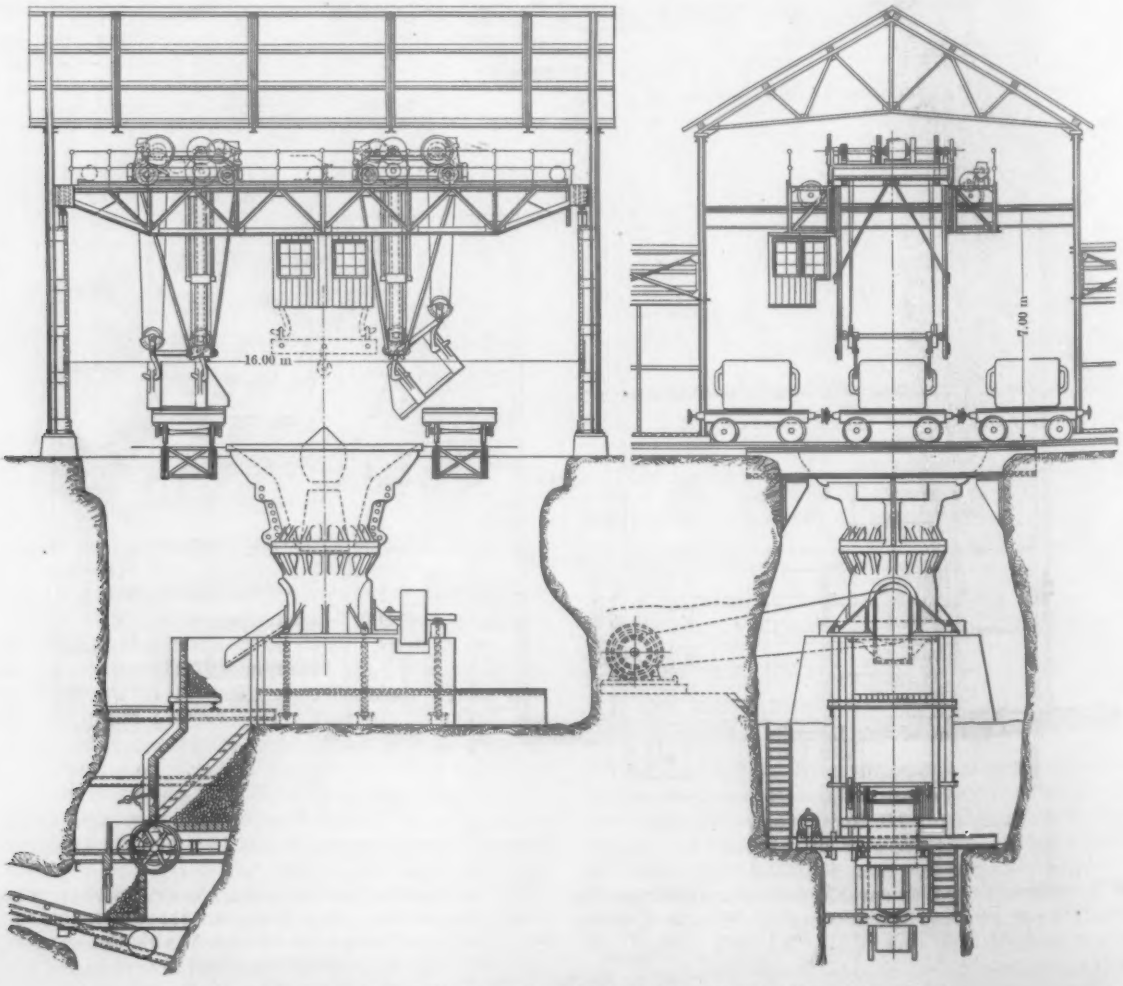


Fig. 6.—End and Side Elevations, Showing General Arrangement of Crushing Plant.

Fig. 7.—Concentrating and Briquetting Plant at Kirkenes.

The concentrating plant is laid out in 20 similar parallel units. Eight of these are now completed and in operation. The programme calls for the immediate installation of four additional units and the work on these is now going on. The capacity of each unit was calculated as 300 tons per 24 hours, a figure that the operations to date indicate will probably be exceeded. Still, with 12 units going at that rate, the plant will handle 3600 tons of crude ore daily.

The arrangement of the concentrating and briquetting plant is shown in Fig. 8. Each unit comprises a crude ore bin preceding a Hadfield jaw crusher, one conveyor belt taking the ore from the crusher to a distributing bin, two ball mills fed by automatic feeders, two sets of tandem Gröndal separators, two tube mills, and two sets of finishing separators, also tandem. The finished concentrates are collected in settling tanks, where the water drains off, and are, after a certain interval, transferred by grab buckets to the shipping track or to the briquetting plant. The whole plant is built in a series of steps or terraces, one step being provided for each operation of the process. On account of this general incline of the plant the ore passes from the distributing bins through the whole plant by gravity, the flow of water assisting its travel.

Highest up are the crude ore bins. They are constructed entirely of concrete and rest upon the rock. The ore is drawn from them automatically by means of roller feeders to the Hadfield crushers standing in front of them. The construction of these crushers is quite different from that of the usual American type. The swinging jaw, for instance, is so shaped that the upper half of it makes a smaller angle with the stationary jaw than the lower half. The fulcrum of the movement is raised rather high over

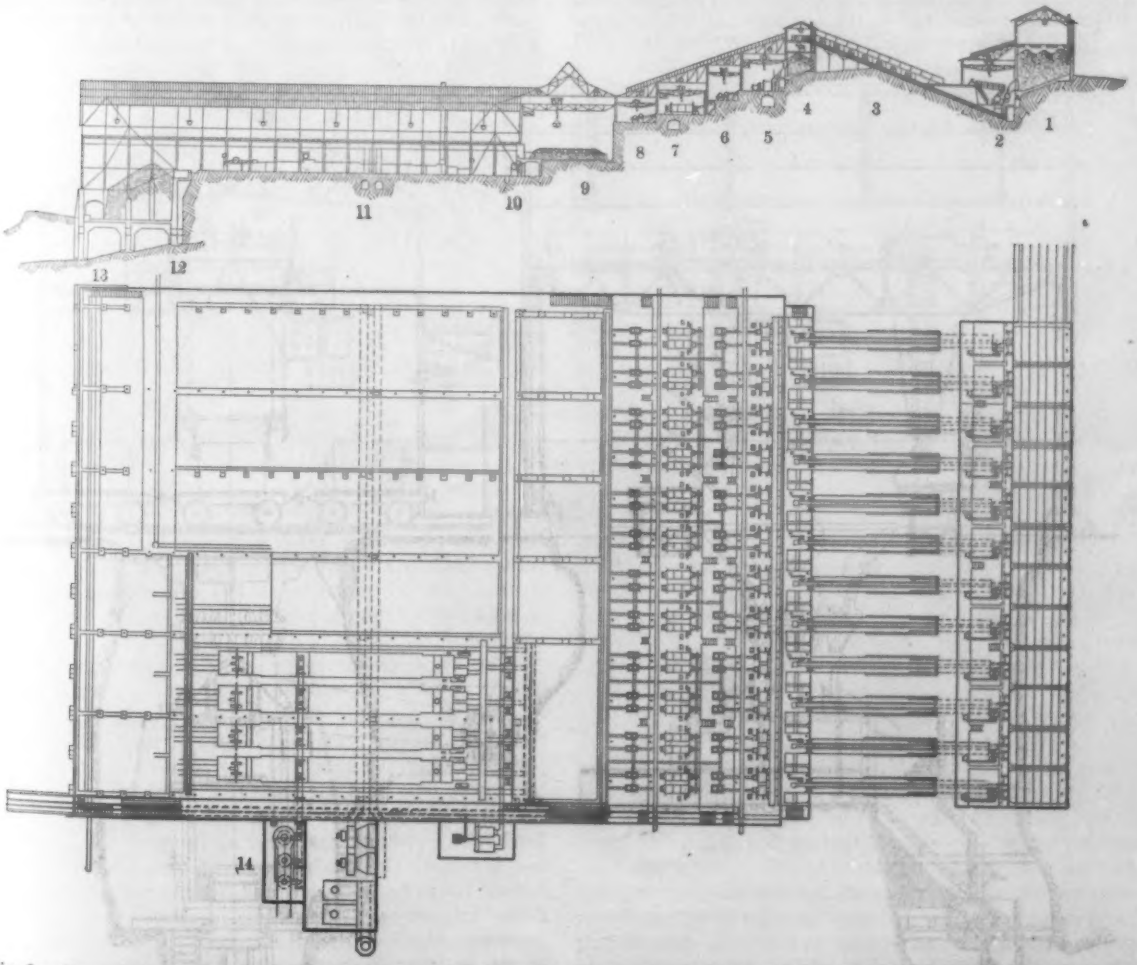


Fig. 8.—General Arrangement of Concentrating and Briquetting Plant. 1, Crude Ore Bin; 2, Hadfield Jaw Crushers; 3, Conveyor Belts; 4, Distributing Bins; 5, Ball Mills; 6, Tandem Gröndal Separators; 7, Tube Mills; 8, Finishing Separators; 9, Settling Tanks for Concentrates; 10, Gröndal Briquetting Presses; 11, Gröndal Briquetting Kilns; 12, Storage Place for Briquettes; 13, Railroad Track for Outgoing Finished Product; 14, Gas Producers.

the frame. In this way a better grip of large pieces of ore is obtained, so that they are not so likely to jump out of the crusher. In these crushers the ore is reduced to a maximum size of 1½ to 2 in. After this it is carried by means of conveyor belts from the crushers to the distributing bins over the ball mills. From this place down, including the briquetting plant, there is one continuous open building through which the ore gradually passes.

The ball mills are fed by automatic feeders of the type in which the ore is scraped by a stationary knife from a revolving disk. At this place is added the water which carries the ore through the grinding mills and the separators. The ball mills, Fig. 9, are of the Gröndal type, built of cast iron cylinders lined with chilled cast iron bars, which form a corrugated surface similar to what is known in this country as the El Oro lining. It has been used in the Gröndal mills for 10 years or more. The mills are charged with 4 tons of cast iron or steel balls. In one operation they grind ore fed to them from a size

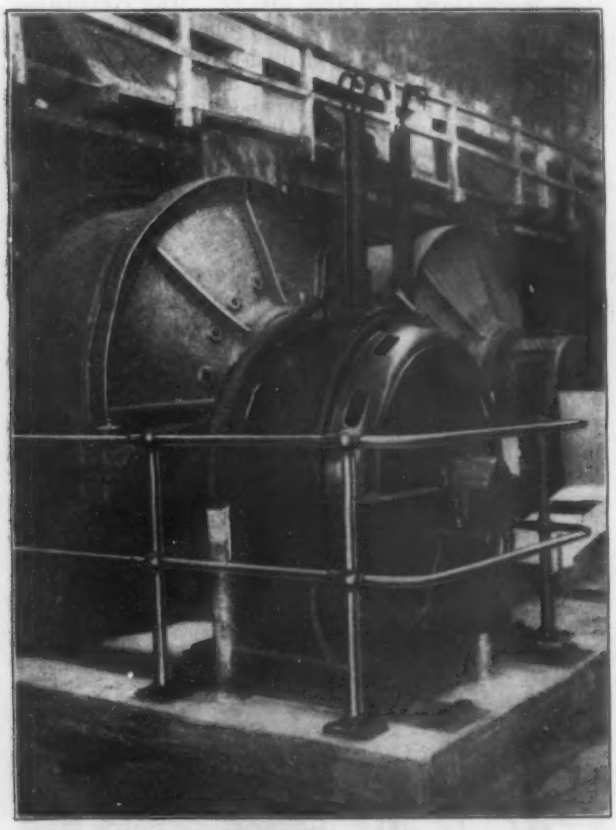


Fig. 9.—Electrically Driven Gröndal Ball Mill.

of 1½ to 2 in. down to about 20 mesh. The size of the discharge is governed by the amount of ore and of water fed to the mill. The illustration shows the mill with its individual motor drive. Its capacity varies between 150 and 200 tons of crude ore in 24 hours.

From the ball mills the ore continues to the first set of magnetic separators. These are of the standard Gröndal type, with 34-in. face and 28-in. diameter of the drums, and, as mentioned, are arranged in tandem. The brass drum rotates around a fixed system of electromagnets of alternating polarity, Fig. 10, with its lowest point about ⅛ in. above the water level of a weir box. The characteristic feature of the separator is that the pulp is not fed directly on the drum, but is brought into the field of magnetic influence by being flushed by the water current from the preceding ball mill through the weir box under the drum. The magnetic particles are drawn out of the water and against the drum. Carried by its rotation out of the field, they are easily washed off by water. By the operation of the machines in tandem the first machine, which receives the whole output of the ball mill, can be allowed to run considerably overloaded. The intense magnetic field will extract all magnetic particles, but in their on-rush they may envelop and carry with them a portion of the non-magnetic tailings. The second machine, receiving the concentrates from the first one, is relieved of the bulk of non-magnetic material. It operates under better conditions and delivers a product higher in iron. Together the two machines make a thorough separation of more than 150 tons of crude ore per day of 24 hours. The current required for magnetizing purposes amounts to 8 amperes at 220 volts for each separator. They are belt driven by the same 3-hp. motor.

From the tandem separators the magnetic pulp runs directly into tube mills mounted on the next terrace of the building. Fig. 11 gives a view of the separators and tube mills. The latter are of somewhat modified type, with the bearings especially well designed. The object of the tube mills is to further comminute the concentrate from the first tandem separators, making it possible to raise the iron content a little more. In certain cases, when the ore is of fine granulation, the rule is to run the ball mills so that a portion of the discharge stays on, say, 20-mesh screen; then in the concentration of it the iron percentage may be raised only to 50 to 55 per cent., and therefore a retreatment is required. The Sydvaranger ore is very fine grained and therefore contains a large percentage of middlings in this product, necessitating the tube mill grinding. The final separation afterward on the finishing separators, which are entirely like the first set, like them running tandem, raises the iron content in this case to 69 per cent., the sulphur and phosphorus being lowered to respectively 0.015 and 0.006 per cent.

The finished concentrates are delivered by means of distributing launders to big settling tanks, of which there are six, constructed entirely of concrete and occupying the entire width of the building. They have each a capacity of 3000 tons of wet concentrate. While some of them are being filled by means of distributing launders, the others which have had the surplus water drained off are emptied by means of a grab bucket. Fig. 12 gives an interior view of this part of the mill.

Briquetting Kilns

At present only eight briquette kilns are installed. They are built in pairs, each one operated entirely independently of the other. They will take care of half the output of the mill, the capacity of each being about 100 tons of briquettes in 24 hours. It is proposed to ship the remainder of the concentrates without briquetting, and the company has therefore installed two rotary dryers, through which this part of the product will be passed to eliminate such water as cannot be drained off. This means that the purchaser will have to briquette the fine material. It probably is impossible to use it in blast furnace operations in its fine condition, as too large a part of it would be blown over into the flues. The drying is done in order to escape the freight charges on the 8 to 10 per cent. of moisture that cannot be drained off.

The fine ore taken by the grab buckets from the settling tanks is dumped into hoppers which deliver it to presses of the Gröndal type. The briquettes are 6 in. square with a thickness of 2½ in., and weigh when burnt about 12 lb. each. When delivered by the presses, they are placed by hand edgewise in two tiers on flat cars. Each car will hold 1¼ tons. No binder whatever is used, but the moisture of the concentrate is sufficient to hold the briquettes together so that they can be easily handled.

The kilns are of the well known Gröndal type, consisting of long channel furnaces, through which the briquetted ore on the flat cars slowly passes. The cars together form a continuous intermittently moving platform dividing the kiln into two compartments. Through the lower one, cold air is drawn in order to protect the trucks from the heat of the upper one. The kilns are fired with producer gas entering through the arched roof not far from the discharge end. The combustion gases travel toward the inlet end of the kiln, meeting the damp briquettes, drying them, and slowly heating them to the intense temperature of the combustion zone. Here is the greatest heat, reaching 2500 degrees F. The briquettes agglutinate, with a complete recrystallization of the whole mass. There is a highly oxidizing atmosphere throughout the whole kiln, caused by the blowing in of

several times the amount of air required for the combustion, this air having been highly heated in cooling off the briquettes when they have passed the combustion zone and before they leave the kiln. Thus the magnetic concentrate is converted into a ferric oxide of iron. This material has all the characteristics of hematite and

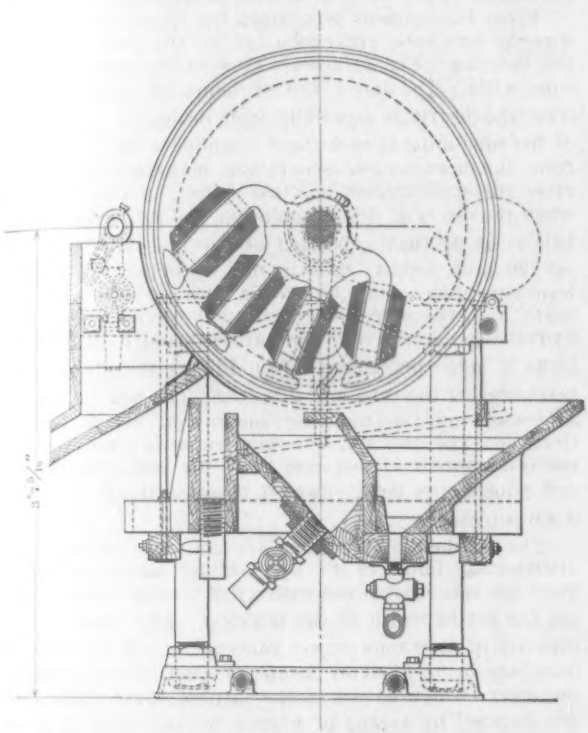


Fig. 10.—Sectional Elevation of Gröndal No. 5 Separator.

therefore is not open to the objections sometimes raised to magnetites by blast furnace operators.

When the cars are discharged from the kiln, the briquettes are taken directly to the dock to be loaded into steamers, or, when no steamer is at hand, they are stored in a place provided opposite the loading dock. There is also some space available inside the briquetting plant, just at the end of the kilns.

It has been said that the kilns are fired with producer gas. This is obtained from a battery of gas producers of standard type in an adjoining building. The coal consumption per ton of briquettes is about 6 per cent. of the weight of the finished product.

No other labor is employed around the plant than the pressmen, who are expected to handle 25 tons per man and shift, and the discharge men, who transfer the briquettes from the cars to the 10-ton buckets, in which they are conveyed to the harbor. The empty briquette cars are returned to the presses by means of an endless chain haulage.

Analysis of Concentrates

The fine concentrates when ready for shipment are of remarkable purity. A representative analysis is as follows:

	Per cent.		Per cent.
Fe	69.00	AlO	0.16
CaO	0.25	SiO	3.80
MgO	0.24	P	0.006
MnO	0.07	S	0.015

In the briquetting of this material, the percentage of iron will be reduced 1½ to 2 per cent. on account of the up-oxidation of the magnetite. The weight will naturally increase correspondingly from the weight of the dried concentrates. The analysis shows: Fe, 67 per cent.; P, 0.006 per cent.; and S, 0.008 per cent.

General Features of Construction

The buildings are of steel with brick filling between the columns. Light in them is especially well provided by sky and side lights. Although they are in a country of heavy snow fall, no special precautions have been required to take care of heavy snow loads, as the heat within the buildings melts the snow as soon as it falls on them. Floors throughout are of concrete with all launders from grinding mill, &c., sunk into them, so that there are no obstructions to free passage in front of the machinery and on its sides. All units of machinery are driven by individual motors, so that the plant is entirely free from shafting and belting. Over each step or terrace of the mill, a traveling crane is arranged for hauling machinery and parts while making repairs, the cranes running at right angles to the slope of the building.

The Heating of the Plant

It is natural to suppose that in a cold climate like that at Sydvaranger it would be necessary to take great precautions to keep the plant warm in winter time, so as to prevent the water conduits, &c., from freezing. As a matter of fact, the only means of heating the enormous building is an arrangement by which some of the waste heat of the combustion gases when leaving the briquette kilns is employed to warm the air. The combustion gases are drawn by means of an exhaust fan from the kilns and before being discharged into the atmosphere they are forced through radiators in a heating chamber above the kilns. Cold air from the outside is forced by a blower to circulate around the heating elements and then allowed to escape into the briquetting building. From there it naturally rises gradually through the whole plant.

Water Supply

The water required for the concentrating process is pumped by centrifugal pumps to the ball mill floor; there it is introduced into the system and gradually descends with the ore. As condenser water from the surface condenser of the plant is used, it has a temperature of 10 to 12 degrees above freezing point when it reaches the mill. All the water except the drainage water from the settling tanks, which is re-introduced into the system, is wasted with the outgoing tailings. As salt water from the fjord is used, there has been no need for economizing, as is the case at other places where the tailings are caused to settle in large settling ponds and the cleared water is reused indefinitely. Here the tailings are run directly into the fjord through a cast iron pipe, discharging at some distance from the shore.

Fig. 11.—Separators and Tube Mills.

Ore Loading Cranes

The briquettes to be shipped are loaded into self-dumping buckets holding 10 tons each. Three of these are placed on a flat car and hauled by an electric locomotive with third rail system to the harbor, a distance of about 1200 ft. They reach the loading place at an elevation of about 85 ft. above water level. Two loading machines similar to the Brown Hoist system have been provided to convey the buckets to the hold of the steamer. The loading machines are built by Becham & Keetman, Duisburg, Germany. They are 172 ft. in length, of steel throughout. The lower leg of the traveler, as in Fig. 13, is supported on a concrete dock 330 ft. in length, outside which there is a depth of water of 26 ft. The loading capacity of each crane is 100 tons per hour. Fig. 14 shows one of the travelers completed.

Power Plant

It was originally intended to build a steam power plant at Kirkenes and at the same time exploit the waterfalls of the Pasvik River, which are only about five miles from the mines. As the river at this place forms the boundary line between Norway and Russia, it involved such difficulties to make proper arrangements that eventually the idea had to be abandoned and steam was adopted as the sole power.

The DeLaval Steam Turbine Company of Stockholm was entrusted with the construction of the whole plant; and by its courtesy the data given have been obtained. For the fully completed plant, the programme provides for three steam turbine generators for three-phase alternating current of 800 to 850 volts each of a maximum of 3750 effective horsepower; one steam turbine generator for three-phase alternating current, 800 to 850 volts of 360 effective horsepower; one steam turbine generator for continuous current, 220 volts of 275 effective horsepower; and four large centrifugal directly-driven pumps. The motors are for three-phase alternating current, and the capacity of each pump is 1660 gal. per min. with 230.ft. head.

Only two of the three steam turbine generators have been installed with their auxiliary machines and boilers, but room for the additions is reserved in the building.

The boiler plant will contain, when completed, seven Babcock & Wilcox boilers with superheaters, mechanical stokers, and three 240-tube economizers. Five of the boilers have now been installed. One of these is held in reserve and two boilers are required for each steam turbine. Each boiler has a heating surface of 5375 sq. ft., and the working pressure is 180 lb. per sq. in. The boilers are of standard type and the stoking apparatus is the Babcock & Wilcox chain type. The two economizers are of the Hartmann type, with the water and the waste gases moving in opposite directions. Two boilers and one economizer, with chimney, form a group for one steam turbine. The odd fifth boiler can be coupled to any economizer.

The coal transport arrangement consists of an aerial tramway from the harbor, which delivers the coal to a stock pile in front of the power plant. From here it is elevated in small cars to a large storage bin above the boilers and is drawn in the ordinary way through iron conduits to the mechanical stokers.

In the upper portion of the engine room the two steam turbines are installed. They are run at a speed of 1500 revolutions per minute, and by means of spring couplings are direct-connected to the 2100-kw., three-phase generators. The generators are fitted with direct-coupled exciters. The exhaust steam from the turbines passes to a surface condenser directly below them in the basement of the engine house.

The power plant was ready for trial runs in October, 1909. It was tested by a special committee the following month. Some figures from the report are sufficiently interesting to repeat. The contract with the DeLaval Steam Turbine Company stipulated a coal consumption not exceeding 22 lb. per kilowatt hour, with both the 2100-kw. turbines fully loaded and working condensing with superheated steam. Inasmuch as this stipulation is for net kilowatt hours, it comprises all the coal for the auxiliary machinery. The test, as it turned out, could not be undertaken in full accordance with the contract, as difficulties arose regarding the simultaneous loading of both the generators. Each generator had therefore to be tested separately. The results of the tests were as follows:

Date of tests	Nov. 15-16.	Nov. 16-17.
Steam turbine	I	II
Duration of test in hours	6.5	6
Steam pressure in boilers per square inch, pounds	175	175
Steam temperature at boilers, Cent.	300	300
Steam pressure at steam turbine, pounds per square inch	165	166
Steam temperature at steam turbine, Cent.	274.2	272.6
Back pressure in steam exhaust pipe, pounds per square inch	1	0.818
Steam per hour for steam turbine, pounds	35,520	33,913

Fig. 12.—Interior View, Showing Settling Tanks.

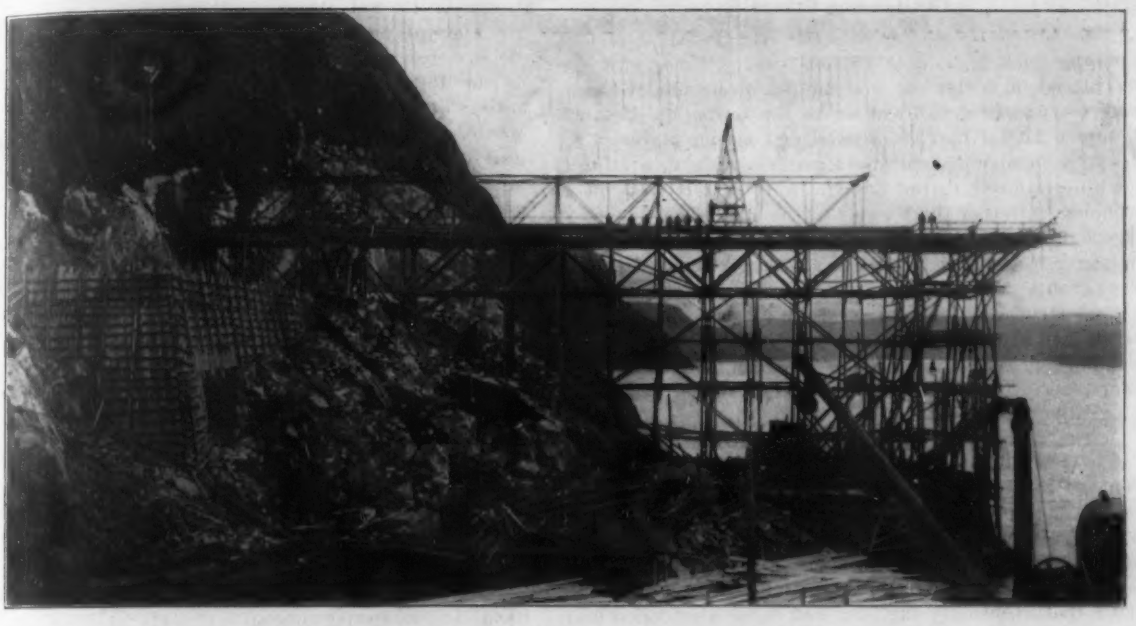


Fig. 13.—Traveling Cranes for Loading the Ore at the Kirkenes Dock.

Kilowatts yielded by generator	2,140	2,135
Steam per kilowatt-hour, pounds	16.61	16
Auxiliary machines, kilowatt-hours	52	56
Net kilowatts	2,088	2,079
Pounds coal per net kilowatt hour	1.91	1.95

The power plant has now been in operation for some time to the entire satisfaction of the company.

In so short a description as this of an undertaking of such vast proportions, it is obvious that only the more important features, those of more general interest, can be described. Nothing has been mentioned of the complete electric equipment for power and lighting purposes; the transmission line from the central power plant at Kirkenes to the mine; the transformer stations; the large air compressors directly driven by motors; the lighting of all the workings by big arc lights—a necessity here where night reigns a great part of the year. Nothing has been said of the repair shops at the mine or the machine shops and foundry at Kirkenes. The great distance from any manufacturing center has made necessary the most complete machine equipment, and the tools installed were selected to meet any kind of emergency, including locomotive breakdowns. Seldom have all the details of a mine undertaking been so well taken care of and in so finished a condition, before the mine was yet in a producing state, as here. The thoroughness of all the engineering work is remarkable.

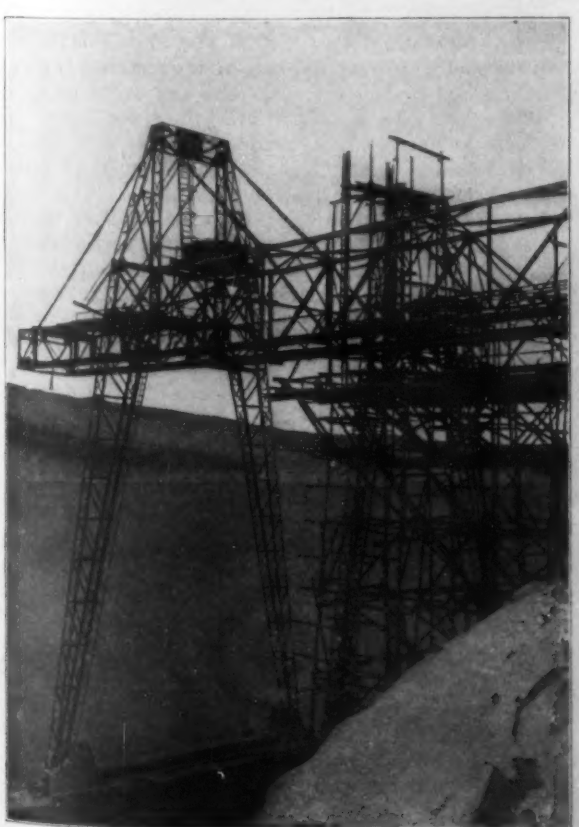


Fig. 14.—One of the Travelers Complete.

Labor and Market Features

As everything else in the place had to be imported from more Southern regions, so also all the labor has been brought in from the South. Labor cost is rather high, wages varying between 13.3 cents and 17.6 cents per hour with eight hour shifts in all branches of the work. The men live in well built houses, for which they pay no rent or a very low one; they have in their houses water and electric light, for which they pay nothing, and have free doctor's attention, medicine, &c. The general impression in this country that labor in Sweden and Norway is much cheaper than in the United States is, as can be seen, hardly correct.

In summing up, the writer wishes to pay the tribute that is due to the courageous men who have conceived this great undertaking and have not hesitated to invest $3,000,000 to $4,000,000 in a venture that was possible and will be profitable chiefly on account of its magnitude. They must have had great confidence in the successful employment of the Gröndal method, by which 1,000,000 tons of a hard ore containing only 36 per cent. iron will every year be ground to a fineness of 60 or 100 mesh—a seemingly expensive treatment for such a cheap commodity. But only after this comminution is a thorough separation feasible. The briquetted product that they are putting on the market will have no superior in either physical or chemical respects. It will be comparable with the highest class Rubio ore; and hematite like that will command a high price and will therefore be able to stand high freight rates to German and English iron works.

The United Engineering & Foundry Company, Pittsburgh, Pa., shipped March 4 one of its high speed steam hydraulic forging presses to the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. The Westinghouse Company had purchased a 7-ton steam hammer, but, on investigating the forging press, decided in its favor, and for this reason will not set up the hammer. The company found that to maintain the high standard attained by its products, it was absolutely necessary to obtain a better class of forged material.

The Link-Belt Company, Philadelphia, Chicago and Indianapolis, announces a reduction in the price of original Ewart link-belt, with the assurance that it will always maintain the high quality of its product.

The Webster Mfg. Company's New Plant

About three years ago the Webster Mfg. Company erected two new shops at Tiffin, Ohio, one for the manufacture of its line of sheet metal goods, elevator legs, spouting, &c., and the other a malleable iron plant for the manufacture of detachable chain, malleable buckets, &c. The operation of these two shops immediately proved the desirability of Tiffin as a manufacturing and distributing point, and the directors of the company decided to move the entire plant there. Suitable buildings for housing the plant have been erected on 38 acres of land which the company secured. The new plant has about four acres under roof. It is equipped with every modern appliance for the economical manufacture of elevating and conveying apparatus.

The buildings consist of the following: Sheet metal shop, 100 x 300 ft.; malleable iron foundry, 120 x 330 ft.; engine room, 30 x 50 ft.; shipping and storage room, 90 x 270 ft.; machine shop, 120 x 300 ft.; gray iron foundry, 110 x 250 ft.; office building, 100 x 210 ft.; pattern vault, 80 x 120 ft. These buildings are of steel frame, with brick walls. They are equipped with traveling cranes of 5 to 30 tons capacity.

The arrangement of the buildings is such that the product is handled but once. The gray iron foundry is supplied with a 30-ton crane, which brings the castings to the machine shop, where they are handled by a 20-ton crane direct to the cars or into the shipping room. The sheet metal shop is furnished with a crane in the same manner. The shipping and storage room being in the center of the plant, everything gravitates toward that one point.

The machinery is all electrically direct driven. A total of 700 hp. operates the plant and equipment. The sheet metal shop has a modern equipment of immense shears, presses and pneumatic riveters, and is further equipped with an air compressor for driving the pneumatic tools of all description. The machine shop has a full equipment of large lathes, boring mills, &c., can take in 18 ft. to 20 ft. sheaves or pulleys, and is thus prepared to do the work of the largest character. This shop is also equipped with a complete air handling apparatus. The gray iron foundry has two cupolas, one of 30 tons capacity and one smaller. The handling of the flasks is done by air hoists and the larger work by electric cranes. The malleable iron foundry has a capacity of some 20 tons per day and is equipped with automatic machines for assembling the chain, as well as apparatus for testing, measuring, oiling, &c.

The shipping facilities are excellent. The Baltimore & Ohio and the Pennsylvania lines both run directly into the shipping room, and besides this the company enjoys the use of the Big Four, which also puts cars into the factory. The gray iron foundry and malleable foundry are served by tracks of their own for delivering coal, iron and coke.

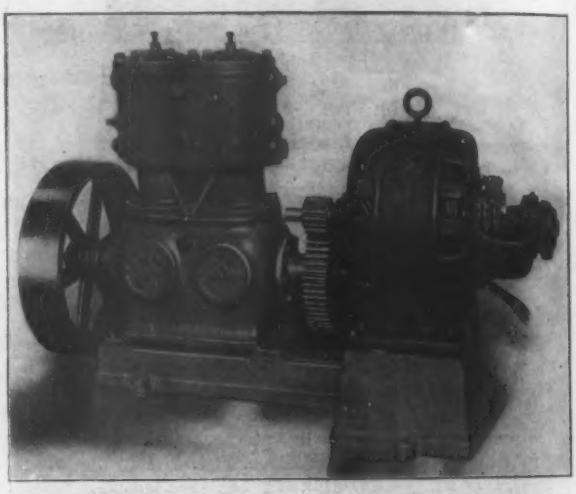
The buildings have been constructed with especial regard to the health and comfort of the employees. The roofs are of the saw-tooth design, with a north light. The artificial lighting of the plant is done by the Cooper-Hewitt system. The heating and ventilating are done by blowers. Commodious lockers have been installed in connection with the toilet and wash rooms. Shower baths have been provided for the employees, and there is also a well equipped hospital room. A system of co-operative insurance has been put in force, under which the employees are cared for in cases of accident or sickness.

The company has just secured the contract for the complete equipment of elevating and conveying machinery, screens, gates, spouts, &c., for the M. A. Hanna Dock Company's new anthracite coal shed, to be erected at Superior, Wis. This equipment will handle, screen and load 200 tons per hour of anthracite coal. The Webster Company is also furnishing the new anthracite coal shed of the Pittsburgh Coal Company at Duluth, Minn., with similar machinery. This plant is designed to handle, screen and load 300 tons of coal per hour. Both of these plants are expected to be the best equipped of their character now in operation or being built.

Pneumatic Handling of Sulphuric Acid

Replacements of piping and other receptacles form an item of considerable expense in chemical manufacturing plants. This is occasioned by the rapid deterioration of these pieces of equipment as a result of acids and fumes coming in contact with them. One especially destructive substance is sulphuric acid and its manufacture is beset with many serious difficulties. Pumps cannot be employed to handle it, as it would be necessary to replace them constantly on account of the exceptionally rapid deterioration. Air furnishes a very satisfactory method of pumping this and other destructive acids and the United Iron Works, Oakland, Cal., has brought out a motor-driven compressor especially designed for this work.

This compressor was installed in the new plant of the Nichol Syndicate at Bay View, Cal., and is one of the 6 x 6 in. Gardner Rix duplex type having a capacity of 40 cu. ft. of free air per minute and operating at a speed of 200 rev. per min., and a pressure of



The Westinghouse Motor-Driven Air Compressor Supplying Air for the Pneumatic Handling of Sulphuric Acid at the Nichol Plant, Bay View, Cal.

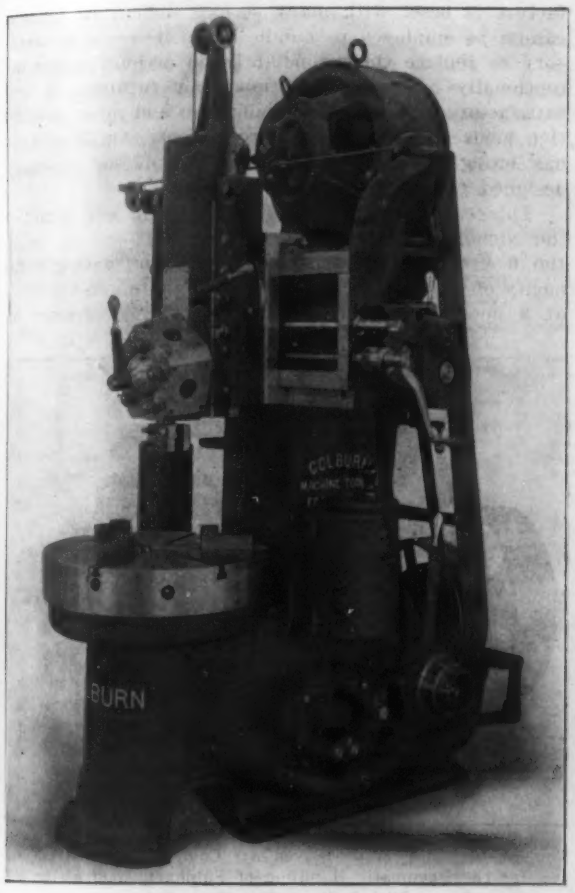
from 60 to 100 lb. The motor was supplied to the United Iron Works by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., and is one of the maker's HF three-phase, 60-cycle, 550-volt, 10-hp. motors. It operates at a speed of 860 rev. per min. and reduction gearing of the spur type is used to bring its speed down to that of the compressor. A motor of this type is very well suited to the work which it is called upon to perform. The armature is wound for each phase, and the windings are connected to the three collector rings shown at the right end of the motor. A starting resistance is employed and is connected to the armature through the collector rings. The motor is so designed that an exceptionally high starting torque is developed with a comparatively low current and when the motor is put in operation, the resistance is gradually cut out by the controller.

This compressor is used to supply the air required to pump the acid from a cylindrical tank in which it is allowed to accumulate at one stage of the process of manufacture to other receptacles. This tank has inlet and outlet valves, and when it becomes necessary to pump any of the acid, the inlet valve is closed and air is admitted at a pressure of from 60 to 100 lb. This forces the liquid through the outlet valve to other parts of the plant, its flow being controlled by a number of valves in different parts of the piping system.

The Cleveland Crane & Engineering Company, Wickliffe, Ohio, has received a contract through its branch office, 1402 Park Building, Pittsburgh, for an 80-ton 6-motor ladle crane with 65-ft. span for installation in the plant of the Iroquois Iron Company, South Chicago, Ill., of which Julian Kennedy, Pittsburgh, is consulting engineer.

A Motor-Driven Colburn Boring Mill

An especially good application of motor drive to a small boring mill is the one recently made by the Colburn Machine Tool Company, Franklin, Pa. It is a 30-in. mill and the motor a 4-hp. adjustable speed Westinghouse type SA direct current motor, with a speed range



A Neat Motor Drive as Applied to a Small Colburn Boring Mill.

of 400 to 1600 rev. per min., with its speed controlled by a drum type machine tool controller with 16 notches.

The motor is mounted on a bracket at the top of the machine, where it is out of the way and beyond reach of chips falling upon it, and is belted to a friction clutch pulley which replaces the cone pulley used with shaft drive. The clutch is controlled by a lever, so that the machine may be stopped for short intervals without stopping the motor. A friction brake operated by foot power permits the ready stopping of the table in any position.

The machine will take work 32 in. in diameter and 16 in. high, where a chuck is used, and 17 in. with a plain table. The 16 table speeds range from 3 to 106 rev. per min. The turret slide has a vertical travel of 21 in. and may be set at any angle up to 30 degrees on either side of the vertical. A graduated scale attached to the slide indicates the depth of holes bored, &c. The five-sided turret has 2¼-in. holes and also ⅝-in tapped holes for attaching special tools. In addition to the regular clamping device for the tool holder shanks, special provision is made to keep the tool holders from twisting under heavy cuts. The lock bolt is of hardened steel, ground true, and works in a hardened and ground steel index ring. Special taper gibs take up any wear in the lock nut easily and quickly, thus keeping the turret holes aligned with the main spindle.

A Barnes Special Horizontal Drilling Machine

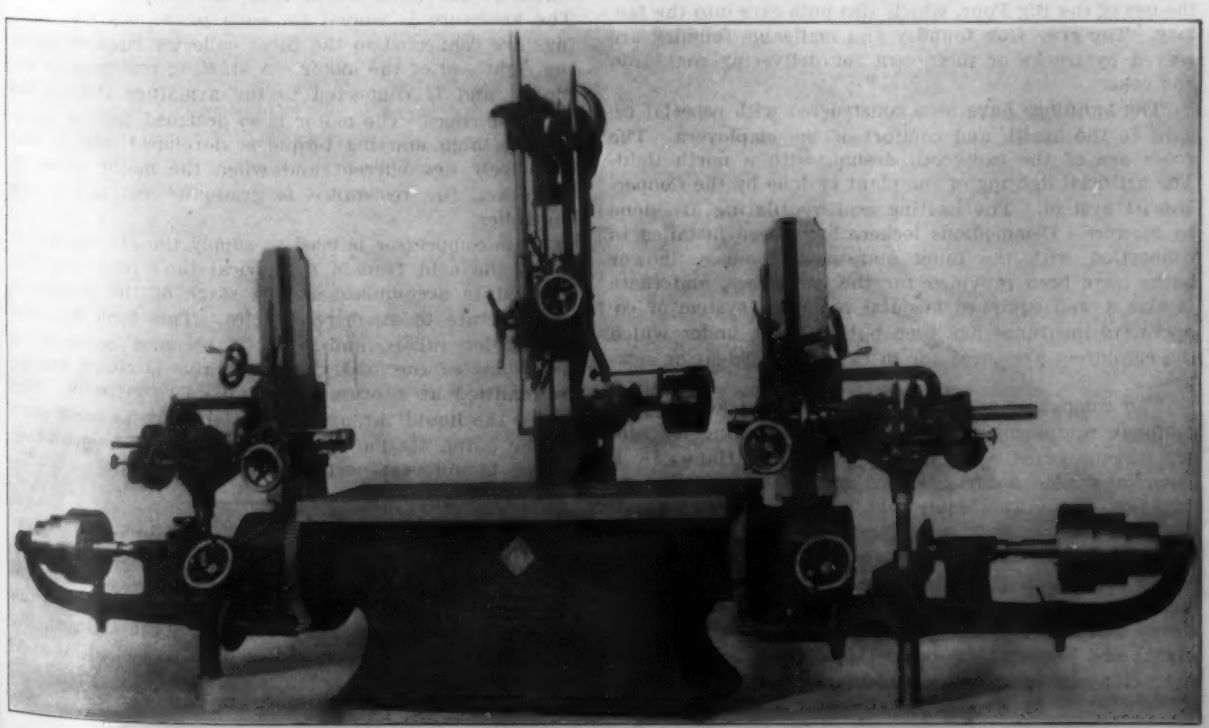
The W. F. & John Barnes Company, Rockford, Ill., has recently completed a special horizontal drill for a manufacturer who desired to bore one or two holes in each end of a casting and also one in the top. To enable this to be done without changing the position of the work after it was once set, the company made a special machine by combining the main parts of its No. 3 horizontal radial drill with a 28-in. sliding head gang drill. One of the special features of this machine is that the vertical head is capable of horizontal adjustment as well as a vertical one. This horizontal movement is secured by attaching the head to a sliding rail at the rear of the machine table, and it is thus possible to locate the vertical head at any distance between the horizontal ones.

This machine is practically the same as the regular No. 3 drill made by this company with the exception of the additional head. All the cone pulleys on the drill heads are of the three-step type and all the heads are back geared. An automatic stop is furnished for each of the spindles.

The following table gives the principal dimensions and specifications of the machine:

Vertical spindle travel, inches	14¾
Horizontal spindle travel, inches	18
Size of table, inches	24 x 65
Morse taper of spindles	No. 4
Width of driving belt, inches	4
Floor space, feet	16 x 7
Weight, pounds	7,000

The machine is well built, is provided with back gears and all parts are within easy reach of the operator.



A Special Horizontal Drilling Machine with Three Heads Built by the W. F. & John Barnes Company, Rockford, Ill.

Iron Ore in Hundreds of Millions of Tons

Deposits in the Baraboo District of Wisconsin Vastly Greater Than Appeared from Earlier Operations—The Steel Corporation's Large Holdings

Amid a most praiseworthy absence of newspaper publicity, the merchantable iron ore deposits of the United States have been increased by hundreds of millions of tons in the past few years, as the result of the discoveries of W. G. LaRue in Sauk county, Wisconsin.

Baraboo District Geology

This is what is known as the Baraboo district, from the chief town of the region. It lies near the center of the southern half of Wisconsin, in Sauk and Columbia counties, with an approximate length, northeast and southwest, of about 25 miles, and with a width of two miles at the easterly end to 10 and 12 miles in the western and central portions. Its relation to the Lake Superior ranges is shown in Fig. 1. The area of the district is approximately 225 square miles, in which the chief rock exposures are of a dense vitreous quartzite, called by the Wisconsin Geological Survey the "Baraboo quartzite." This seems to form a somewhat canoe-shaped syncline, whose axis is approximately northeast and southwest, and whose greatest depth from surface may be about 2000 ft. Included within the impervious walls of this quartzite lie, first, a gray slate; above that the iron bearing member, in the upper part of which lie the higher grades of ore; above that a dolomite, and still higher, filling the remainder of the trough, a sandstone quite thoroughly watersoaked. The quartzite is of the Huronian series, the same rock as is found associated with the iron formations of the general Lake Superior ranges. Knowing this, it would seem natural to expect iron deposits of some nature in connection with the quartzite, but the whole region, except where the quartzite outcrops, is covered by a heavy bed of Cambrian sandstone or by the drift of the Baraboo River Valley. This effectually masked the geological structure and hid the important Huronian rocks. Figs. 2 and 3 show the relations of the iron bearing formation to the inclosing rock, also the locations of the mines.

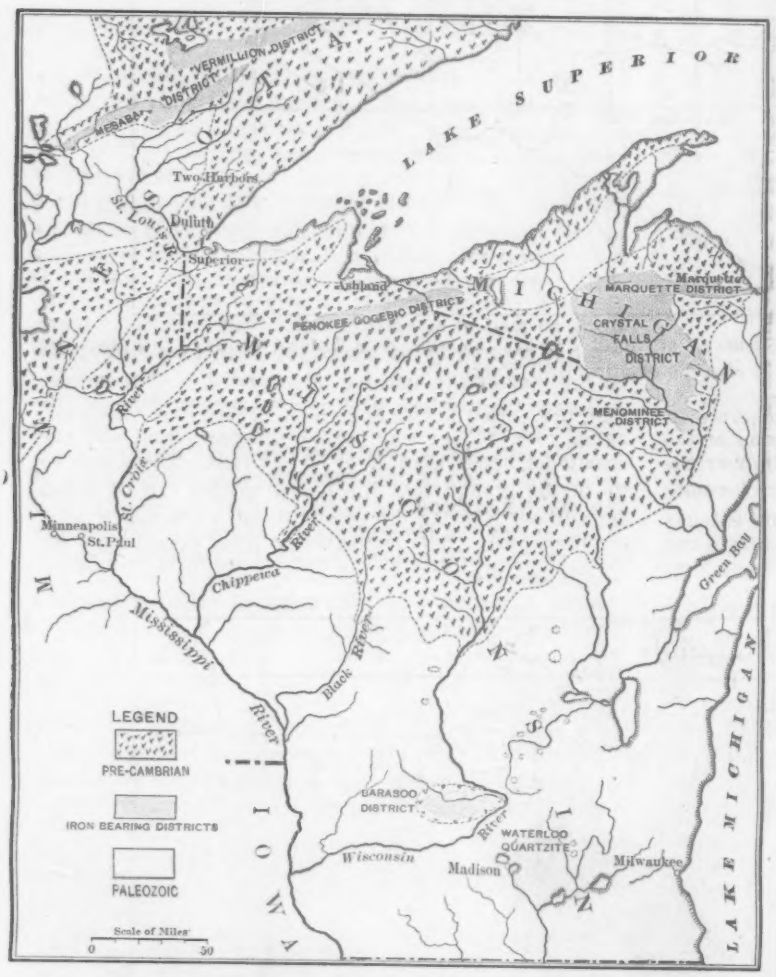


Fig. 1.—Map of Pre-Cambrian Iron Bearing Districts, Showing the Geographic Relation of the Baraboo District to the Lake Superior Districts.

Important Interests at Work

Iron was discovered in the district by W. G. LaRue of Duluth in 1900, after the abandonment of the region by the Douglas Iron Company, which had done considerable work prior to that time. On the conclusion of work by the Douglas Iron Company the Chicago & Northwestern Railroad took its property as a mineral paint mine, and upon the lapse of its lease Messrs. LaRue and Whiteside, of Duluth, and Herman Gotophorst, of Baraboo, took it over and commenced systematic exploration by diamond and other drills. In April, 1900, Mr. LaRue first found ore.

In due course these owners leased a part of their lands to the Deering Harvester Company, subsequently a part of the International Harvester Company, and this company has shipped from its mine, to the time of closing down about one year ago, a total of 310,400 tons, averaging 55 per cent. iron, dried, and about 0.045 per cent. phosphorus. The Iroquois Iron Company, controlled by Rogers, Brown & Co., also sank a shaft 355 ft. deep and did some exploratory work. At about the same time W. H. Donner, in connection with various well-known Pittsburgh interests, in which the Mellen Bank was predominant, carried on extensive work on the westerly side of Columbia county, some 12 miles east of North Freedom, spending not far from $200,000 in drilling, &c. Some 600 to 800 acres were taken as the result of this work. Later this party secured lands two miles south of North Freedom, and is now preparing to sink a shaft and begin mining ore. Machinery for this work has recently been ordered. Mr. Donner and his friends are believed to have spent nearly $500,000 in the district.

The Steel Corporation's Holdings

Before T. F. Cole resigned the presidency of the Steel Corporation's mining interest, negotiations were entered into between that company and Messrs. LaRue, Whiteside and Gotophorst, under which the Corporation finally secured a stretch of land along the formation and some three miles in length. This land began at a point a mile southwest from North Freedom and continued on southwesterly through sections 10, 9, 15, 16, 17, 18 and 19. All the land in this area supposed to be valuable for iron ore is held under this lease to the Corporation, aside from that occupied by the Illinois mine (Fig. 4) in section 16, and a small tract that was bought some years ago by the Grand Crossing Tack Company, and which has passed by lease into the hands of John M. Thomas of the Thomas Furnace Company, Milwaukee, who is mining steadily therefrom at the present time. Included in the negotiations of the Steel Corporation was the Iroquois mine of Rogers, Brown & Co. (formerly known

as the Sauk), for which the Corporation is understood to have paid something like $100,000, and which is now held by it under a 99-year lease.

Before exercising its option the Steel Corporation's Oliver Iron Mining Company expended some $250,000 in drillings operations, and had as high as eighteen diamond drills at work for a year, with a large force of men.

An Estimate of 1,000,000,000 Tons

It is estimated that the Steel Corporation's holdings in the three mile stretch of lands held by it under the LaRue lease, together with other lands under lease and fee to the Oliver Iron Mining Co., contain considerably more than 400,000,000 tons of ore, of which there may be, upon the LaRue lease alone, say 80,000,000 tons of 55 per

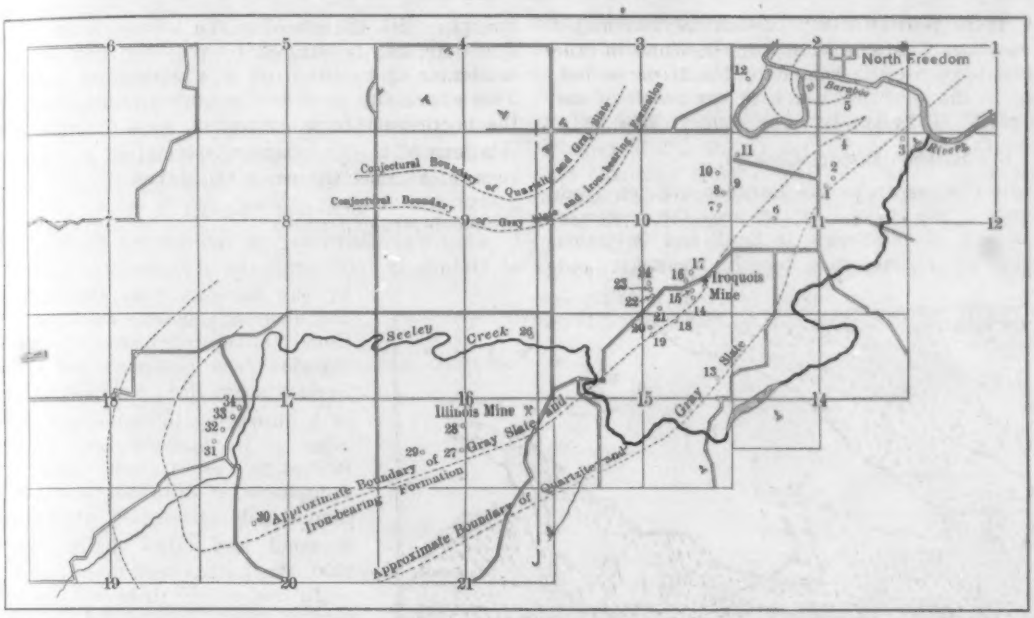

North Freedom
Baraboo River
Conjectural Boundary of Quartzite and Gray Slate Formation
Conjectural Boundary of Gray Slate and Iron-bearing Formation
Iroquois Mine
Seeley Creek
Illinois Mine
Gray Slate
Approximate Boundary of Iron-bearing Formation
Approximate Boundary of Quartzite and Gray Slate

Fig. 2.—Sketch Map of the Area of Exploration Southwest of North Freedom, Showing Drill Holes 1 to 34. This Map Is Prior to Steel Corporation Drill Work.

Ore has been proved for almost the entire distance of three miles and to various depths on the underlay of the formation. This formation dips rather steeply near the surface and flattens lower down, while the ore becomes thicker as depth is reached. To what depth ore extends is not yet known, but drill holes 1800 ft. deep have cut it, and there are several of about 1000 ft. in depth that cent. ore (dried at 212 deg.) some 200,000,000 tons averaging from 40 per cent. to 50 per cent. iron, and the remainder better than 30 or 35 per cent. These ores so lie in the ground that the higher grades can be taken out without injuring the possibility of subsequently mining the leaner. It is estimated by some operators there that the probabilities of the district are in the neighbor-

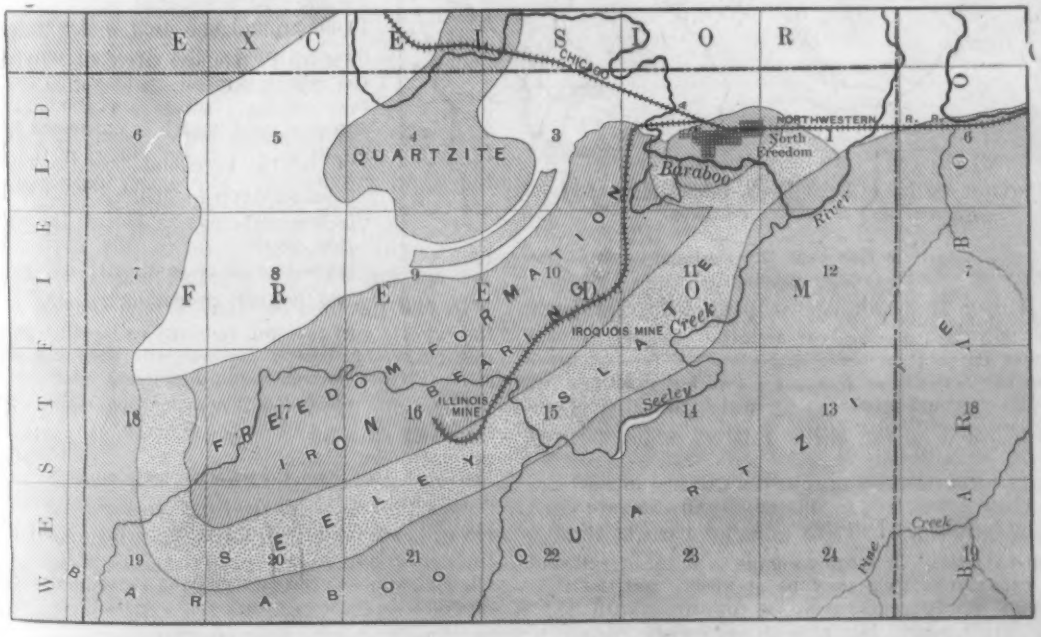


Fig. 3.—Geological Map of the Baraboo District.

show the identical conditions as above and as elsewhere along the strike, with good ore at the bottom of the holes.

The average of some 50 drill holes along the formation showed more than 100 ft. of ore vertically. The Illinois mine is estimated to contain—not entirely from drill holes, but somewhat hypothetically—about 60,000,000 tons of ore, all above 40 per cent. The Steel Corporation controls by lease and fee, nearly 2000 acres, all of which is reasonably certain to be underlain by ore.

hood of a billion tons. The ore as it stands in the ground is not especially wet, but in mining it becomes a pasty mass, full of hygroscopic moisture. It was the idea of T. F. Cole and of W. J. Olcott, who succeeded him as president of the Steel Corporation mining interests, that a long campaign of pumping should precede mining on any commercial scale, thus draining the sandstones and making operations simpler. This is now under way. The Oliver Iron Mining Company has erected extensive im-

provements at its Iroquois shaft, including its standard stone and brick engine and boiler houses, and stacks, a steel headframe, etc., and is now pumping about 800 gallons of water daily. This is far less than was being pumped under the operations of the Iroquois Iron Company, in the same ground, indicating either that the overlying formations are being drained or that the former operators were repumping much water. Doubtless this pumping will be continued for some time before any considerable tonnage of ore will be extracted from the Oliver properties. As stated above, Mr. Thomas is now mining steadily, and the Donner party is arranging to mine soon. It is quite possible that the Illinois mine of the International Harvester Company, which is surrounded by Steel Corporation properties, will be reopened in a short time. It is about twelve miles from the early work of the Donner party, in the west side of Columbia county, and the scene of greatest activity, southwest from North Freedom. So far no ore has been found along the probable trend of the formation between these points. But in due time it is not impossible that a fairly continuous ore bearing formation may be located in this now barren territory; in which case the tonnage possibilities of the district will be greatly augmented.

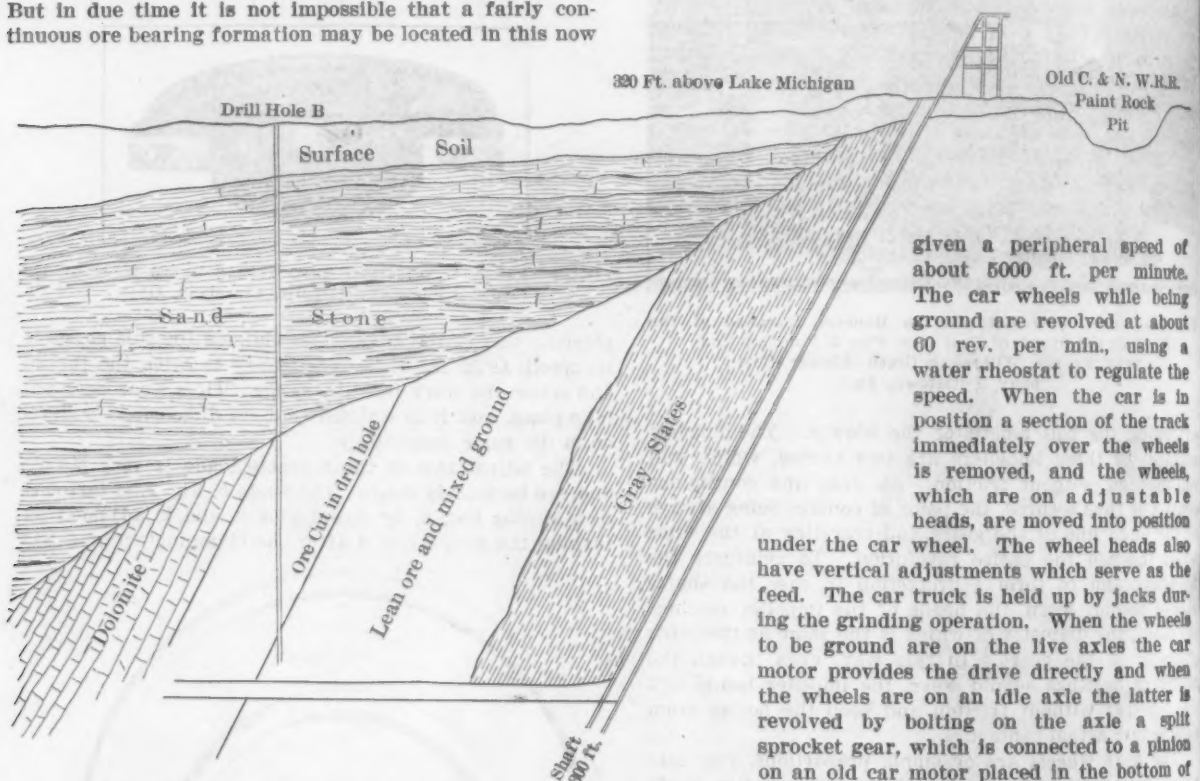


Fig. 4.—Cross Section of No. 1 Shaft, Illinois Mine of the International Harvester Company.

The Oliver Iron Mining Company holds its lands under a 99-year lease and at royalties materially less than those current on Lake Superior. A few of these are at so low a figure as 10 cents a ton, but most are far higher. The annual minimum for which the Oliver Company is obligated to the LaRue interest is 150,000 tons only.

Freight rates on these ores to the Chicago district are now 70 cents a ton, less by 10 cents than the rate from Mesaba range points to Lake Superior ports, and it is supposed that when a large tonnage is assured railroad companies a lower rate may be secured. But, be that as it may, the 70 cents must be compared with $1.50 from Mesaba range points to Chicago points.

D. E. W.

The Foote Brothers Gear & Machine Company, Chicago, has received an order from the Universal Portland Cement Company, Buffington, Ill., for 50 spur gear reducers of 30 hp. each; also a contract from the Milwaukee Grain Feed Company, Milwaukee, Wis., for 16 spur gear reducers of 25 hp. each, with a reduction of 20 to 1. Both of these contracts were secured in competition with similar equipment made by other concerns.

Grinding Car Wheels Without Removing Them

The editorial in *The Iron Age* February 23 on "The Cast Iron Car Wheel and the Grinding Machine" prompted the Quincy, Manchester, Sargent Company, Plainfield, N. J., to write regarding an equipment it builds for grinding car wheels when they have developed flat spots, without removing the wheels from the car. Although such equipments have been used by the Public Service Corporation of New Jersey for some time, the essential details are of enough interest to deserve calling attention to in connection with the editorial already referred to. The grinder is installed in a pit in the car barn, so that the car may be run directly over it, and has two grinding wheels, one to act on each of the two wheels on one car axle. Usually the drive is by belt from a motor of about 20 hp. and the emery wheels are given a peripheral speed of about 5000 ft. per minute. The car wheels while being ground are revolved at about 60 rev. per min., using a water rheostat to regulate the speed. When the car is in position a section of the track immediately over the wheels is removed, and the wheels, which are on adjustable heads, are moved into position under the car wheel. The wheel heads also have vertical adjustments which serve as the feed. The car truck is held up by jacks during the grinding operation. When the wheels to be ground are on the live axles the car motor provides the drive directly and when the wheels are on an idle axle the latter is revolved by bolting on the axle a split sprocket gear, which is connected to a pinion on an old car motor placed in the bottom of the wheel grinder pit. The emery dust and grindings are taken care of through an exhaust system.

Records from the use of the machine by the Public Service Corporation in a number of its shops show that the average cost for grinding wheels is 59 cents per pair, and the time required 17 min. One pair of grinding wheels will last for from 50 to 90 grinding jobs. In one particular test a car was run over the pit at 2:50 p.m. Fifteen minutes was required to jack up and connect the car motor to the water rheostat. The grinder was started at 3:05, and, running at a medium feed, ground down a 1-in. flat spot in 30 min. At 3:40 the car was out in service again. The scheme possesses undoubted advantages as compared with the one of removing the car wheels for grinding in the shorter time that the car is out of service and is also cheaper, as where wheels are removed it has been estimated that it costs from $4 to $5 a pair to grind out their flat spots.

The Leader Foundry & Machine Company, Quincy, Ill., recently took over the Reliable Foundry & Machine Company, Fort Madison, Iowa, manufacturer of dustless tumbling mills, and the Quincy Enameling Company. It is also associated with the Hayton Pump Company and the Hydman-Hess Magneto Company, Quincy. It is equipping its foundry to give special attention to the manufacture of supplies for wagon manufacturers, and is further erecting an enameling plant which will shortly be in operation. It also manufactures power presses and other machinery for sheet metal workers.

The Green Foundry Blowers

The Wilbraham-Green Blower Company, Pottstown, Pa., is manufacturing under the Green patents a type of blower which is especially adapted for foundry use. These blowers are made for motor, engine or belt drive, and Fig. 1 shows the second of two motor-driven blowers having a capacity of 112 cu. ft. per rev., which has been installed at the plant of the Standard Cast Iron Pipe & Foundry Company, Bristol, Pa. The pulley-driven blower illustrated in Fig. 2 has a displacement of 25 cu. ft. per rev., and its special feature is the placing of the driving pulley close to the bearing.

The working parts of these blowers are two balanced impellers. Each of these is a single casting which is well ribbed internally and firmly cast on a forged steel shaft

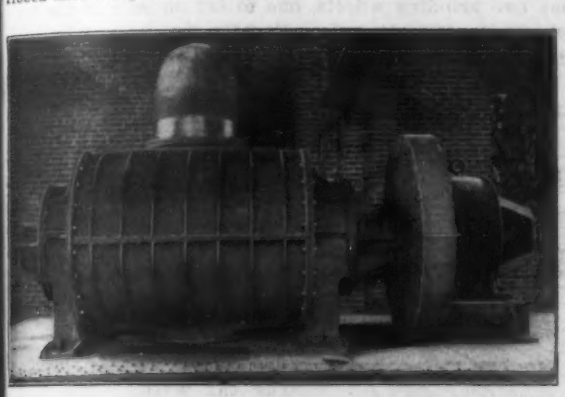


Fig. 1.—One of Two Motor-Driven Blowers Installed at the Plant of the Standard Cast Iron Pipe & Foundry Company by the Wilbraham-Green Blower Company, Pottstown, Pa.

extending the full length of the blower. The finished surfaces of these impellers are two circles, which will roll together without friction. An even and continuous contact is thus secured, the point of contact being always on the pitch line of the gears and traveling at the same speed through the entire revolution. To reinforce the impellers and to form a protection in case the shafts should become worn, the heads of the impeller castings are disks, the diameter of which is the same as the pitch diameter of the gears. In this way, even though the shafts or bearings should wear, the impeller heads will roll together without friction and keep the bodies from coming into actual contact.

The gear wheels are of ample proportions, run continuously in oil and are keyed to the impeller shaft close to the faced projections on the exterior of the head plate, which form collars at each end of the blower, thus preventing the impellers from rubbing endwise against the interior of the head plates. The casing for the gears is formed by an extension of the head plate and the

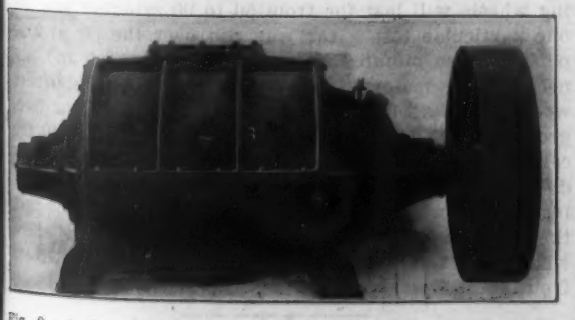


Fig. 2.—A Belt-Driven Blower Having a Displacement of 25 Cu. Ft. Per Revolution.

journal bearing castings which avoids the use of light castings. Inclosing the gear wheels in this way affords protection against accidents and prevents dirt from accumulating while the blower is in transit or operation. The head plates are well ribbed and are further strengthened by making the hoods or extensions into which the circular ends of the impellers project a part of the head plate casting.

The journal bearings are bushed with phosphor bronze and fitted with ring oilers. As they are bolted and fastened with dowel pins to the head plate they can be detached from the blower and removed and returned to their original position easily. The blower casing has additional reinforcement and is made rigid and firm by inserting pipe plates between the head plates and the circular casing.

The Wood & Spencer Adjustable Snap Thread Gauge

A new snap thread gauge has been brought out by the Wood & Spencer Company, Cleveland, Ohio. Although designed for the rapid and accurate inspection of automobile parts having large diameters and fine pitch threads, the gauge is equally well suited for the inspection of other work. Fig. 1 is a view of the gauge in use, while Fig. 2 gives details of the adjustable blade em-

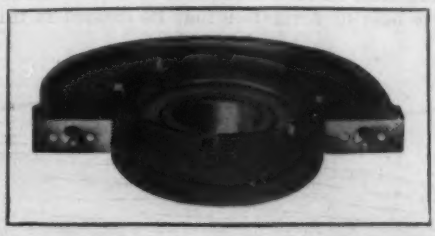


Fig. 1.—The New Adjustable Snap Thread Gauge Made by the Wood & Spencer Company, Cleveland, Ohio.

ployed. One of the advantages claimed for this gauge is its speed, as in use it is unnecessary to catch the thread and screw the work into the gauge. Thus wear does not take place, and it is claimed that its dimensions will remain the same indefinitely.

The adjustment of the movable blade is very simple and can be quickly made. The blade *b*, Fig. 2, is fastened to a sliding bar, *e*, by dowel pins *c*, and is adjusted by turning the stop screw *d* after the clamping screw *a* has

Fig. 2.—Sectional View Giving Details of the Adjustable Blade.

been loosened. When the adjustment has been made the clamping screw is again tightened and locks the blade in position. The maximum adjustment which can be secured is 1-16 in.

The gauge is rigid in construction and accuracy in indicating whether the pitch angle at the top or the bottom of the thread is correct is secured, as the various parts are simple and the working surfaces can be accurately cut and lapped to any desired shape. The body is made of cast iron, and hardened and ground tool steel is used for the blades which are interchangeable.

Two different styles of gauges are made, one being adjustable and the other non-adjustable. Both types of gauge are made in various sizes ranging from ¼ to 12 in.

The 600-ft. lake freighter that is being built for the Jones & Laughlin Steel Company will be named for Thomas Walters, Ishpeming, Mich., who is mining expert for the company.

Steel Cutting with the Oxy-Acetylene Torch

Data Regarding Costs and Special Uses

Anything to burn must be heated in the presence of oxygen, and the temperature necessary to start combustion varies with the material. Steel, for example, requires a very high temperature, and the more directly the oxygen is supplied the more rapidly will it burn. Intimate contact with pure oxygen, rather than air, in which the oxygen is greatly diluted with nitrogen, will hasten the starting and increase the rate of the combustion. The cutting of steel by actual burning has become commercially practicable only since there have been available torches giving a flame of sufficient heat intensity, such as the oxy-acetylene blow pipe, the flame of which has a temperature of about 6300 degrees F. After the steel to be cut has been heated to the melting point, a special supply of oxygen under higher pressure than that used for the torch flame is delivered through a separate tube directly at the cutting point.

Fig. 1.—The Wreck of a Pier Destroyed by Fire, the Steel Work of Which Was Cut Up with Davis-Bournonville Oxy-Acetylene Cutting Apparatus.

In the cutting apparatus manufactured by the Davis-Bournonville Company, 90 West street, New York City, the oxygen and acetylene for the flame are supplied in the ratio of 1.28 to 1, by volume. The other jet is of oxygen alone, and is arranged close to the flame jet to take advantage of the high temperature created by the latter. By moving the double nozzle along at proper speed a smooth cut is obtained by burning that can be made practically as deep and narrow as one made by a tool, due to the localization of heat possible with the very high temperature. The metal disappearing from the cut is in great measure combined with the oxygen to form oxide of iron, passing off in the form of fine particles. The carbon probably goes off as carbon monoxide or carbon dioxide. These are both gases and so pass off into the atmosphere. A part of the metal runs out of the cut in molten condition, but is still iron.

The oxide is the reason for the considerable supply of oxygen necessary. Its chemical formula is Fe_3O_4., and the atomic weights of iron and oxygen being 56 and 16 respectively, the oxide mixture is in the ratio of 21 to 8 by weight, so that each ounce of iron burned to iron oxide requires 8-21 oz. of oxygen. An ounce of oxygen occupies 0.7 cu. ft. at atmospheric pressure. To make a cut ¼ in. wide 1 ft. long in 1-in. steel would remove 3 cu. in. of metal weighing about 13½ oz. The small amount of carbon contained is negligible and, assuming the iron to be burned entirely to oxide, the cutting will take 5 1-7 oz. of oxygen, or 3.55 cu. ft., at atmospheric pressure. This amount of oxygen must be supplied in the time of making the 1-ft. length of cut. Temperature will not take the place of oxygen, nor will oxygen take the place of temperature. So it is useless to attempt to make up for the lack of either by an oversupply of the other.

Why Cast Iron Cannot Be Cut

A curious fact is that steel can be cut by the oxy-acetylene process, but not cast iron. The difference between steel and gray cast iron lies in the carbon and its condition. In steel all the carbon present is chemically combined with the iron and cannot exceed about 2 per cent. Gray cast iron contains more than this and much of its carbon exists uncombined. Whether it is because of a difficulty in getting a sufficiently high temperature, or what, it seems to be the carbon that makes the trouble. It may not be so much because of the total amount present as the manner in which it exists, partly uncombined. That the difficulty relates to the necessary temperature would seem to be corroborated by what is seen in connection with arc lights. The temperature is very high and oxygen is present, though in a diluted form; still the carbon burns away rather slowly. In fact, carbon is used for electrodes largely because of its slow combustibility. Cast iron can be fused and welded readily enough by the oxy-acetylene process, but not cut. The materials to which the cutting process is applicable are commercial wrought iron and steel. Steel can be cut in any form, whether rolled, forged or cast, and very thick sections as well as thin ones. The metal loss is but little, as the activity is purely local. Thus, a bar of steel 6 in. square can be cut in two with a cut about ⅛ in. wide. A little more metal is involved because of slight irregularities, but this is a small matter.

Steel 6 in. thick can be cut at the rate of about 1 ft. in 3 min. The oxygen requisite for such a cut is about 20 cu. ft., plus the oxygen for the heating tip, which costs about 2½ cents a cubic foot. If there is considerable similar work to do an inexpensive man can readily learn to do it. For cutting various thicknesses different nozzles may be easily substituted. The apparatus is readily portable, and can be taken up on a scaffold at the side wall of a building to cut off projecting ends of steel girders, or can be taken down into a confined space at the side of a boiler, or other steel structure, to cut it up into manageable pieces.

Comparison of Costs

A comparison of the cost of removing risers from steel castings by sawing and by oxy-acetylene cutting is interesting. In a certain case 181.69 sq. in. were cut with a saw in 405 min. The labor involved amounted to $1.90 and the grinding of the saw $0.86. Exclusive of power the total cost of cutting was $2.76, or 1.52 cents per square inch. With the oxy-acetylene process on similar work 135 sq. in. were cut per hour.

Estimating the labor at 25 cents per hour, the oxygen used at 2 cents per cubic foot and the acetylene at 1 cent, it has been calculated that the expense was 0.8 cents per square inch, or not much more than half the cost of cutting with the saw.

In cutting a lot of miscellaneous sizes the oxygen used by the heating tip was 55 cu. ft. and by the cutting tip 140 cu. ft. There were 38 cuts in all, the areas ranging from 1.56 to 75.6 sq. in. The total area amounted to 615.56 sq. in. or an average of 16.2 sq. in. per cut. The total time occupied in doing this work was 82 min. 40 sec. Of this 19 min. 5 sec. was spent in preparing for the actual cutting, leaving for the cutting operations proper 63 min. 35 sec. On the average it required half a minute preparatory work for each cut, 1 2-3 min. for the cutting operation proper, a total of 2 1-6 min. per cut of 16.2 sq. in. Per sq. in. cut the total time required amounted to a little over 8 sec. Including delays amounting to 36 min., or an average of nearly a minute for each cut, each cut may be considered to have taken 3 1-6 min. instead of 2 1-6 min., or something less than 12 sec. per square inch. In the cutting of cast steel risers with the cold saw, the time actually spent in cutting, 405 min. for 181.69 sq. in. cut, gives an average of 2.23 min. per square inch. This is 11 times the time required by the oxy-acetylene.

Costs of Individual Torch Cuts

One of the cuts with the torch was through 3½ x 1½ in steel (5.25 sq. in.). In 5 sec. the preliminary heating was done and in 1 min. more the cut was made, the average time per sq. in. being 12 1-3 sec. Another cut was 9 x 4 in. and the whole cut of 36 sq. in. was made in 9 min. or 1 sq. in. in 15 sec. The preliminary work here occupied 1½ min. Another cut, 40 sq. in. was done in the same total time and with the same preliminary time. Still another, a cut of 6 x 2½ in. (15 sq. in.), took 20 sec. preliminary work and the whole operation 80 sec., or 5 1-3 sec. per square inch. This example shows the possibilities of rapidity and consequently economy, in doing duplicate work. Where the conditions are practically the same a little experimenting would show the best sizes of nozzle and the best pressures for the jets, especially the cutting jet. The question of nozzle size is important. The waste of steel involved in making too wide a cut may be disregarded but not the waste of gas and labor. A cut 3-16 in. wide when ⅛ in. is practicable, means the disintegration of 50 per cent. more metal and employment of 50 per cent. more gas and labor. The effort should be to use the smallest nozzles practicable, to save, not merely steel, but the expense required to consume it. Very deep cuts can be made with very thin jets.

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Fig. 2.—Scotch Marine Boilers in Process of Being Cut Up with Oxy-Acetylene Torches.

In another series of tests 16 miscellaneous cuts were made ranging in area from 3.53 to 21 sq. in. and totaling 187.46 sq. in. The heating jet consumed 5 cu. ft. oxygen; the cutting jet, 37.5 cu. ft. Five cuts were precisely the same (2¾ x 3½ in.) but the total times varied from 1 to 1.42 min. The cutting jet was used for a series of intervals ranging from 55 to 70 sec. The cut was made twice in the 55 sec. Here is an example of the possibilities of reducing expense by attention to the conditions under which the work is done when that work is largely duplicate. The preliminary in one of these cases was only 5 sec. the whole operation being completed in 1 min. Among the 16 cuts, two were made with steel having 1 per cent. carbon content. One of these was a round bar 3 in. in diameter, 7.07 sq. in. sectional area.

This cut was made in 160 sec. or at the rate of 1 sq. in. in 22.7 sec. The other was a half round 3 x 2½ in. having a cross section area of 3.55 sq. in. The time consumed in the whole operation was not kept, but the pure oxygen jet was used for 100 sec. as compared with 135 sec. for the former case where the area was double. If this area was calculated correctly the total time consumed per sq. in. was still greater than 22.7 sec. These results would seem to show that high carbon steels are harder to cut than the mild varieties.

For the total of 187.46 sq. in. the oxygen cost $1.0625, or 0.567 cents per square inch, estimating oxygen at 2½ cents per cubic foot. With the acetylene at 0.048 cents and labor at 0.107 cents the total cost was 0.722 cents per square inch. In the series of 38 cuts the total area amounted to 615.56 sq. in., and the oxygen expense $4.875, or 0.792 cents per square inch. The acetylene and labor

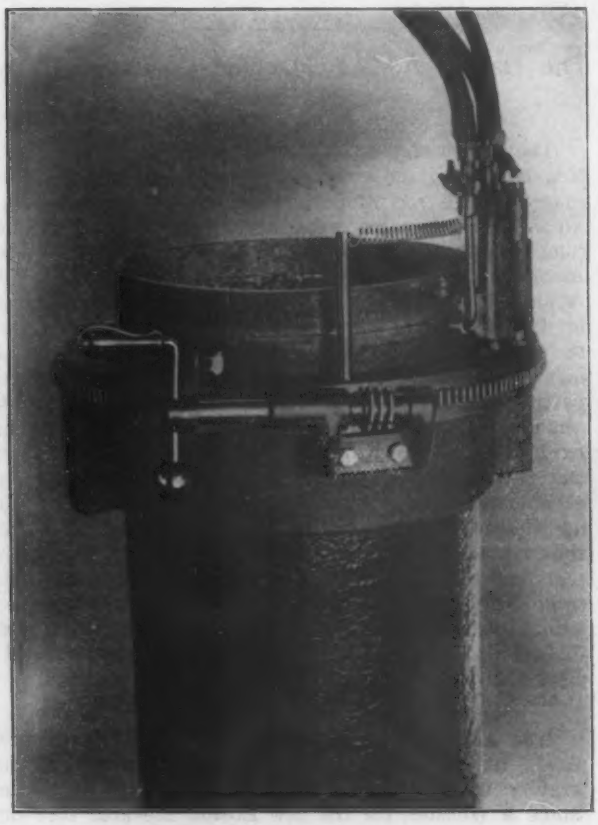

Fig. 3.—A Davis-Bournonville Device for Guiding a Torch Cutting Off the Top of a Pile Shell.

costs just used were really ascertained in this test; consequently, the total expense per square inch was 0.947 cents. This is higher than the amount disclosed by the other series of cuts. For miscellaneous work, perhaps, it would be fair to estimate the cost at 1 cent per square inch.

Some Notable Cutting Operations

This process of cutting steel is attractive not merely for its economy but also because of the portability of the apparatus. An example serving to cover both matters was the wrecking of Pier 14 on the North River, New York, following its destruction by fire July 9, 1910. It extended about 700 ft. into the stream and carried a steel structure 50 ft. wide and 700 ft. long, containing upwards of 2000 tons of steel. A Philadelphia firm agreed to wreck it in 30 days, or forfeit $300 for each day excess of that time. It had been expected to use as many as 35 men, doing the work in the usual way, but it was found that by using Davis-Bournonville oxy-acetylene apparatus the force could be reduced. In fact only about 18 men were required, and the work was completed in 23 working days. Only a small amount of the cutting was done without the torch. Fig 1 shows the conditions when work was begun.

The removal of the swing span of the Madison avenue bridge across the Harlem River at New York is another striking example of the suitability of oxy-acetylene cutting. This span was 330 ft. long and weighed 450 tons. While removing weight from one side it was necessary, since the span was supported at the center, to block up the other side, and this kind of work consumed much of the time. As each section was removed its weight was taken by a floating derrick and the piece cut off was lowered to the grillage of the fender. The first pair of sections weighed about 25 tons each; the next about 66 tons each. The remainder of about 270 tons was then removed in three pieces. The cutting time was about four days; the total time, one week. It is said that under the older methods it would have taken six weeks or two months for the job. Two outfits were employed. Of oxygen about 1500 cu. ft. was used; of acetylene about 450 cu. ft. The expense for the gases at 2½ cents for oxygen and 1 cent for acetylene was about $42.

Such examples show the economy of torch cutting, but it is also especially adapted to difficult situations. At 95 William street, New York, a tank of ½-in. steel plate, 4 x 8 x 10 ft., was to be removed, and there was only 1 ft. working space around it. A sledge could not be swung to cut the rivets, and it could not be moved so as to help matters. With the oxy-acetylene torch, however, it was cut up into 12 pieces in one day, whereas by other means it would have taken a week or 10 days.

A similar case was the removing of two old boilers from a North River ferry boat. The steel was ⅞ in. thick. By ordinary methods it would have taken 12 days and 16 men, and cost at $2.50 per day per man, $480. With the torch the job was done in 11 hours by one man at but a very small fraction of that cost. Fig. 2 shows a number of Scotch marine boilers in process of being reduced to scrap, all of the cutting upon which was done with torches. The pressure on the cutting oxygen was 45 lb. per square inch.

Mechanical Torch Guiding Devices

Attention is now being turned to the use of mechanical means for guiding the torch when cutting work. Fig. 3 shows an arrangement designed for cutting off the tops of the outer steel shells of a certain kind of bearing pile after they are in final position. It is desirable to have the cut perfectly horizontal. This device was designed by the Davis-Bournonville Company and with it the cut can be made evenly and expeditiously.

Another device regulates the cutting of flat plate steel and with it a cut 78 in. long has been made in ⅞-in. steel in 195 sec. or at the rate of 1 ft. in 30 sec. and a cut 6 ft. long in ⅝-in. plate in 149 sec. or at 1 ft. in 25 sec. A circular cut, 19½-in. periphery, was made in 1-in. steel plate in 45 sec. The oxygen pressure with ⅞-in. steel was 40 lb. per square inch. With 15-lb. pressure, ½-in. steel may be cut at the rate of 1½ ft. per minute; with the same pressure, 9-16-in. plate at the rate of 1¼ ft. per minute, and with pressures ranging from 25 to 42 lb., plate ¾, 1 and 1¼in. thick can be cut at the rate of 1 ft. per minute. The width of the cuts as made in these operations is about ⅛ in.

Where a manufacturer has much work of a standard character, as, for example, the cutting of 1-in. plate the best adjustments can be made after a little experimentation. Thus the precise pressures and sizes of nozzles and rate of movement of the hand screw controlling the torch can be determined to the best advantage as regard the work, the time and the consumption of gases.

The Phœnix Iron Works Company, Meadville, Pa., announces the appointment of W. M. Bastable as its New York City district sales agent. The company manufactures high-grade automatic cut-off engines, boilers, feed water heaters, &c. Mr. Bastable has been for a number of years with the Franklin Boiler Works Company, and will hereafter be located at 135 William Street, New York City.

The National Alloy Company, Ltd., has assumed control, by purchase, of the Metal Mfg. Company, Twenty-fifth and Dickinson streets, Philadelphia, Pa., where it will continue to manufacture and prepare ferromanganese, ferrosilicon, ferrochrome and other alloys for the foundry trade. Henry P. Miller is president and Daniel B. McAllister is secretary and treasurer.

The Osgood Valveless Force Feed Oiler

The J. L. Osgood Lubricator Company, 131 Erie County Bank Building, Buffalo, N. Y., has brought out a mechanical valveless force feed oiler which is especially adapted for gas, gasoline and steam engines of all classes, machine tools, high speed machinery and all kinds of general service. Fig. 1 is a view of the maker's type A oiler, and Fig. 2 is a sectional view showing the simplicity of its construction and the positiveness of its action.

Springs and valves of all descriptions have been elim-

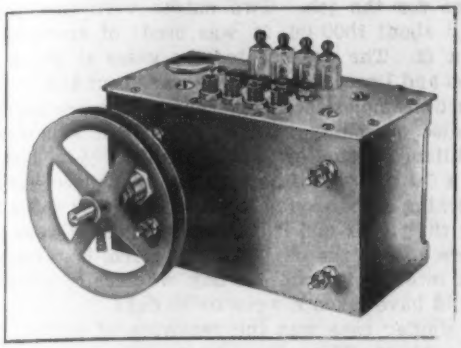

Fig. 1.—The Type A Valveless Oiler Manufactured by the J. L. Osgood Lubricator Company, Buffalo, N. Y.

inated in the oil passages, and also as a part of the feed controlling mechanism. It is thus possible to pump heavy and even dirty oils where an oiler with valves would either feed irregularly on account of foreign substances lodging underneath the valves or clogging them, which would render the oiler inoperative. These oilers are manufactured with any number of feeds, that having four feeds being the one illustrated. Each feed is adjusted independently, and can be regulated to feed any number of drops from none to over 300 per minute.

One of the special features of the oiler is that the operating spindle can be revolved in either direction without using cross belts. For this reason it is possible to use the oiler on an engine which has to be reversed frequently, as the direction of rotation of the spindle can

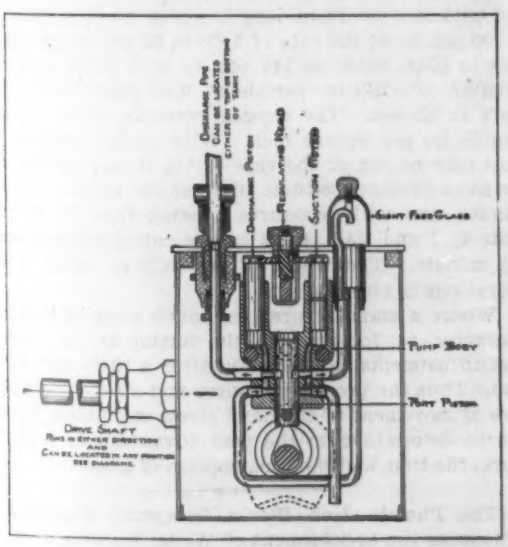

Fig. 2.—Sectional Elevation of the Oiler.

be changed quickly without breaking a feed. The mechanism is simple, and runs constanly in oil, which reduces wear to a minimum. As the mechanism, regardless of the number of feeds, is attached as one unit to the underside of the oil reservoir, it is possible to inspect it by simple removing the drive shaft and the cover screws.

In installing one of these oilers it is set in a level horizontal position and bolted securely in place. The ends of the pipes connecting the points of lubrication with the oiler are inserted in the discharge pipe, care being taken to force the end of the discharge pipe down into the lower half of the discharge coupling. The upper half of this coupling is then screwed down tightly and compresses a composition gasket which is inserted in the union firmly and tightly around the pipe. The flow of oil is adjusted by the regulating head, Fig. 2, which has six complete turns between the limits of delivering no oil and delivering the full capacity. To deliver the full capacity of the oiler the head is turned to the left until it bears against a stop. To shut off or decrease the feed the head is turned to the right, and when it bears against another stop the feed is completely closed off. Any adjustment between these two extremes can be secured by turning the regulating head in either direction. A sight feed glass is provided which enables the rate at which the oiler is feeding to be seen from a considerable distance. In addition to this box type of oiler, a cylindrical oiler with glass or brass sides can be supplied. The capacity of the square type of oiler varies from 4 to 14 pints.

The Dalton Adding Machine Company's New Factory

The Dalton Adding Machine Company, Poplar Bluff, Mo., celebrated the completion of its new factory February 14 with receptions in the afternoon and evening. Among those present were the representatives of the company, assembled from all parts of the United States. Among the guests were Henrik Bechschoft and his father of Riga, Russia. The structure is two stories of brick and concrete, covering a ground space of 45 x 250 ft. It is built with unusually large window areas. The main floor will be used for a machine shop and tool department, while the second floor will be used as an assembling room and for offices, &c. The ground floor has hard maple flooring, and the second floor concrete. Artificial lighting is provided for by 196 tungsten lamps on each floor, making a total of over 31,000 candle power; in addition to this a large electric sign has been placed on the roof. It is expected that all the machinery will be in place and the factory in running order by March 15. The total cost of the building is $200,000. The company manufactures adding, listing and calculating machines. J. L. Dalton is president; Griff. Glover, vice-president; Byrd Duncan, treasurer.

The American Ship Windlass Company, Providence, R. I., reports the following recent orders for Taylor gravity underfeed stokers: 16 7-retort stokers, from Stone & Webster, for the new Boston Elevated Railway plant at South Boston; 56 7-retort stokers for the New York Edison Company's two Waterside stations; 3 4-retort stokers, repeat order, for the Detroit public lighting plant, Detroit, Mich.; 1 6-retort stoker for the Pfister & Vogel Leather Company, Milwaukee, Wis. The selection of Taylor stokers for the New York Edison Company's plants is of particular interest, because of the fact that this company has conducted extensive experiments on various types of stokers since the completion of Waterside station No. 2. The 56 stokers ordered will be installed under 56 650 hp. Babcock & Wilcox boilers, which have heretofore been hand fired. That the stokers ordered should be of the Taylor type, of which there are already 13 in this station, should prove of unusual interest to combustion engineers.

The Newark Foundrymen's Association, Newark, N. J., at a meeting on March 1 amended its constitution so that foundrymen in New Jersey outside of Newark can be admitted to membership. It will hold a regular meeting in May, to which foundrymen and foundry supply men throughout the State will be invited. It is the purpose of the association to extend its scope and make it a State wide organization.

The Taylor-Wilson Mfg. Company, Pittsburgh, Pa., recently received an order from J. P. Piedboeuf & Cie, Dusseldorf-Eller, Germany, for pipe threading and coupling screwing machines.

The Garvin Automatic Chuck

A New and Labor Saving Device Which Is Either Spring or Air Operated

A new type of automatic chuck which is made in various sizes with two or three jaws is being placed on the market by the Garvin Machine Company, Spring and Varick streets, New York City. These chucks can be operated either by springs or by air and a number of different styles of operating mechanism can be applied to the device, thus adapting it to meet conditions existing in all classes of industrial plants. Fig. 1 shows the details of one of the two-jaw chucks, and Figs. 2 and 3 show the construction of spring and air operated stop and open design chucks respectively, while Figs. 4 and 5 are corresponding views of the open only type. Fig. 6 shows a special chuck for holding bevel pinions, and Fig. 7 illustrates what is known as the automatic index chuck which is intended to be used on that class of work where two or more points lying in the same plane are to be operated on.

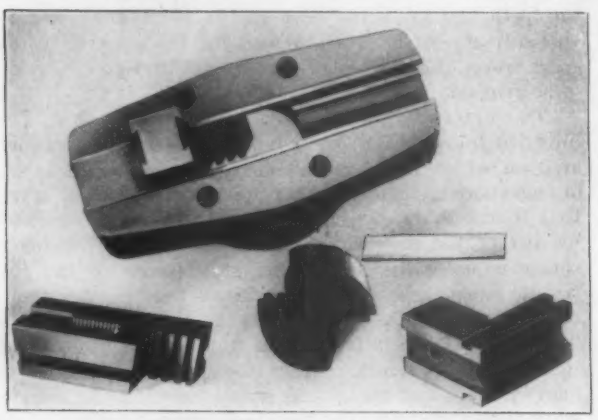

Fig. 1.—The Parts of the Automatic Chuck Made by the Garvin Machine Company, New York City.

As will be noticed from Fig. 1, the body of this chuck is similar to that of the ordinary types and carries an actuating jaw, which has a series of multiple wedges milled at an angle on its end. The wedges in the central draw plug fit into these wedges on the jaw and by moving the plug to the rear both jaws are pulled to the center. For adjusting the dovetailed jaw to and away from the center, there is an adjusting screw which carries on its inside a locking screw for clamping the jaws

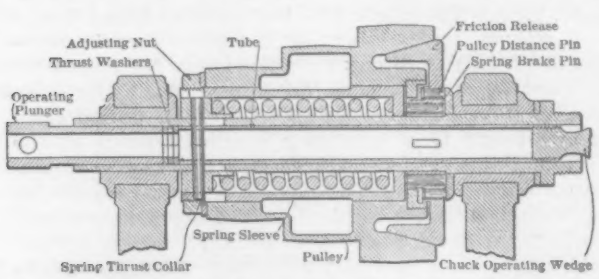

Fig. 2.—Details of the Stop and Open Design of Spring Operated Chuck.

in position when the required adjustment has been made. The dovetails on this jaw are cut on both sides so that it can be reversed. The adjustment of the jaws is independent and their operation universal. The two-jaw chucks are the same as the three-jaw type, and the jaws regularly furnished are of the step type, although various other styles can be furnished if desired. The chuck is fastened to the nose of the spindle in the customary way, and a pull rod or tube is screwed into the central plug of the chuck, the other end being attached to the operating mechanism.

The stop and open spring mechanism which the maker furnishes on all of his machines is illustrated in Fig. 2. A heavy spring mounted inside the cone pulley and around the spindle bears at its rear end against a spring

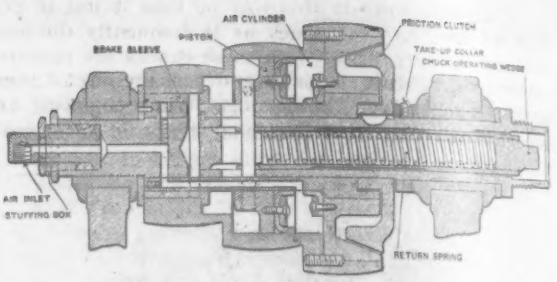

Fig. 3.—Sectional Drawing of the Air Operated Chuck.

thrust collar. A taper pin which extends through an elongated slot in the spindle and then passes through the draw rod passes through this collar. A pull of 800 lb. is exerted by this spring on the draw rod, and as the multiple wedges in the chuck are cut on an angle, a leverage of 4 to 1 is secured with the result that the work is gripped at a pressure of 3200 lb. A foot treadle attachment is connected to the operating plunger at the rear of spindle, and a downward pressure on the treadle automatically carries the friction out of the cone pulley. The brake pins and the washer at the rear of the front bearing check the momentum of the spindle and the cone pulley is now running idle. The full movement of the treadle opens the chuck jaws and the machine is ready to receive the next piece. When the treadle is released, the pressure of the spring closes the jaws on the work, carries the friction into the cone pulley and starts the spindle forward at full speed, an automatic arrangement which results in the saving of a large amount of time. The

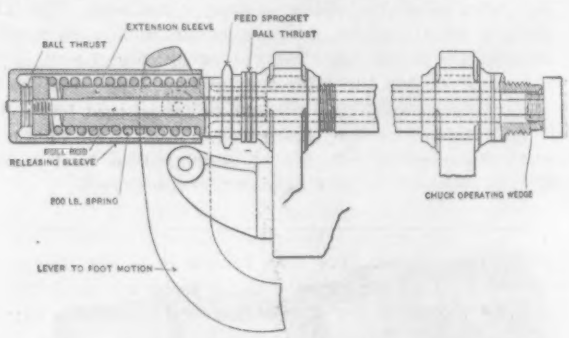

Fig. 4.—Details of the Open Only Outside Spring Chuck.

rapidity attained in the operation of these automatic chucks bears the same relation to a lathe handling irregularly shaped pieces as a collet does to a screw machine.

Where plants are equipped with compressed air, the air operated chuck shown in Fig. 3 can be furnished. This consists of a piston inside the cone pulley, and the piping is attached to the air inlet at the end of the spindle, the operating valve being placed in a convenient location. When the air is turned on it passes through the chamber in front of the piston and forces it back. This closes the chuck jaws on the work, and the pressure of the air in the opposite direction carries the friction into the cone pulley and starts the pulley forward at full speed. When the air is released, the spring inside of the spindle retracts the friction from the pulley while a multiple disk brake on the rear spindle bearing checks the spindle momentum, thus leaving the cone pulley free to run. The pull tube is carried forward by the pressure of the spring in the opposite direction, the chuck jaws are opened and the machine is now ready to receive the next piece.

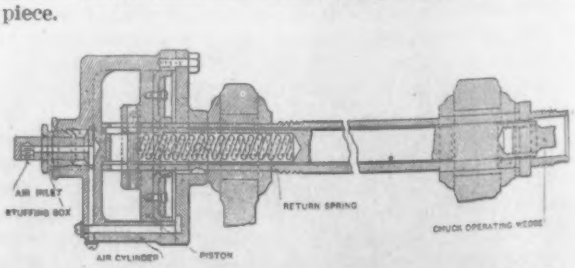

Fig. 5.—Drawing Showing Details of the Open Only Air Operated Chuck.

In chucking work in this way no time is lost in getting the piece into the chuck as is frequently the case with the ordinary type. With these chucks the operator centers and tightens the jaws and possibly one of them grips a high spot on the casting. When the tools are brought into operation the torsional strain shifts the cast-

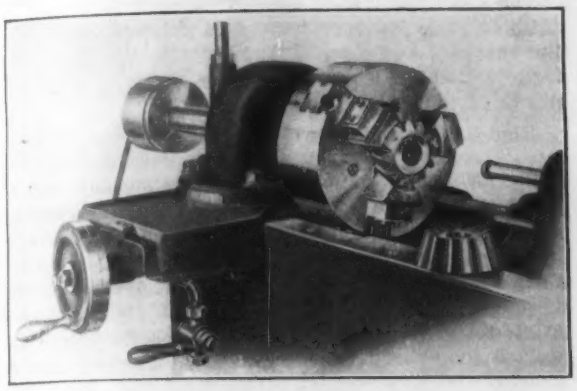

Fig. 6.—The Special Arrangement of Chuck Jaws for Holding Bevel Pinions.

ing from this high spot, and it becomes loose and the operator has to stop the machine and recenter and tighten all of the jaws. With the automatic chuck this loss of time is eliminated, as the grip is a continuous one, and if there is any tendency to slip, the grip increases and holds the casting securely at all times. This operating mechanism is self-contained, and there is no pressure against the bearing boxes while the spindle is running. The air system is very powerful and convenient and is especially desirable where the operations are rapid and where 1000 or more pieces are turned out per day. The gauge pressure recommended is approximately 70 lb. or over, although for that class of work which does not require a heavy grip, a reducing valve can be placed on the air pipe and adjusted to give the required pressure.

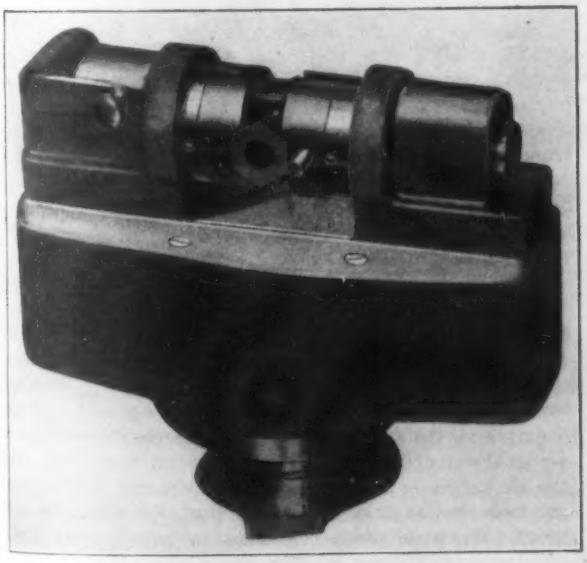

Fig. 7.—The Garvin Automatic Index Chuck.

Where machines are already in use they can be equipped with the spring type of chuck shown in Fig. 4, or with the air operated type shown in Fig. 5. These mechanisms are mounted on the rear of the spindle, the former being operated by a foot treadle and the latter by a valve. In these chucks the opening is controlled by the treadle or the valve and the stopping or the starting of the spindle is done through the countershaft. If desired the maker can supply a double acting air cylinder which takes air in on either side of the piston and does away with the interior releasing spring, as the gripping and the releasing are done by air pressure. This arrangement has been found very convenient for gripping work either internally or externally without reversing the jaws of the chuck. When the spring or the single acting air system is used, it is necessary to reverse the actuating jaws and insert the internal wedge plug for gripping work internally.

Fig. 6 shows a three-jaw chuck arranged for gripping a bevel pinion on the pitch line as well as the application of an air operated chuck to the hole grinding machine of this company, which was illustrated in *The Iron Age* December 29, 1910. A similar arrangement of jaws can be furnished for gripping a spur gear on the pitch line and both types are being used extensively by motor car manufacturers. The jaws in both of these chucks are adjustable to and from the center for gears of different sizes, and they also carry a hardened plate on which a roller is mounted that fits down into the space between the teeth and grips the gear on the pitch line. A sidewise adjustment is also provided for the plate to enable gears where the number of teeth is not divisable by three to be gripped.

The automatic index chuck illustrated in Fig. 7 is intended for work having two or more points to be operated on which lie in the same plane. The construction of this chuck is identical with the others described except that it has index jaws. These chucks can be operated by any of the different mechanisms. When the inside spring is used, the application of pressure to the foot treadle stops the spindle and releases the heavy pressure on the jaws, while an auxiliary pressure is applied to hold the piece firmly in position while it is being indexed. Releasing the treadle causes the piece to be gripped heavily again and the spindle starts forward. To remove work from the chuck, the treadle is pressed down and the spindle stopped; a turn of the finger lever at the left releases the auxiliary grip and the piece can then be taken out. In this way it is possible to finish work at one chucking much quicker than can be done in the ordinary way. Index plates can be furnished for different divisions and all are fully protected from chips. For work where one end of a piece is to be finished from a thread on the opposite one, a special chuck operated in the same way can be furnished. With this chuck the piece can be screwed into the plug and if the chuck is air operated, the turning on of the air presses the piece against the face plate and holds it firmly while the work of machining is carried on. When the air is released, the piece is moved away from the face plate and can be unscrewed from the plug by hand.

Alliance Crane Business

The Alliance Machine Company, Alliance, Ohio, reports a decided increase in inquiries for cranes and general machinery in the past two or three weeks and a very promising outlook for a good year's business. During the recent quiet spell this company has been able to keep its plant running full at double turn in all departments. In one day in the past week it received orders for six cranes, four for the Inland Steel Company and two traveling cranes for the Republic Iron & Steel Company.

Among recent shipments have been a 75-ton ladle crane to a copper plant in Chile, S. A., this crane, with auxiliary machinery going with it, making seven car loads of machinery; a crane to the Inland Steel Company, a crane for the new plant of the Treadwell Engineering Company, Easton, Pa., two slab charging and drawing cranes for the new plant of the American Sheet & Tin Plate Company, Gary, Ind., and a special 4-roll set of bending rolls specially designed for rolling 20-ft. lengths, weighing 100 tons. Among other orders taken this year the company reports the following: Open hearth charging machine and trolley for the Tremont Nail Company, Boston, crane for the Bethlehem Steel Company, open hearth charging trolley for the Inland Steel Company, 40-ton crane for the Portsmouth Steel Company, crane for the Tennessee Coal, Iron & Railroad Company for its coke oven plant, and large gantry crane for the National Enameling & Stamping Company, St. Louis.

The Ohio Seamless Tube Company, Shelby, Ohio, has increased its capital stock from $350,000 to $1,000,000.

New Tools and Appliances

This is essentially a news department for which information is invited.

A Special Duplex Drilling Machine.—A duplex drilling machine which is intended principally for drilling pipe and also for bar drilling where the holes are spaced so closely that they cannot ordinarily be drilled at one setting has been recently built by the Moline Tool Company, Moline, Ill. In designing this machine an effort has been made to overcome the difficulties encountered in previous tools of this type. The pipe is drilled from each side which eliminates the time required for feeding the drill through the hole in the pipe, and the burrs are on the inside, where they are not objectionable. Drilling the pipe from both sides also prevents the breaking of drills, as the tool does not go through and strike the opposite wall of the pipe where it is said practically all the breakage occurs. The pipe is held in adjustable V-blocks and is clamped by plunger rods which are connected to the rails. Both the blocks and the plunger rods can be removed easily if it desired to use any other type of jig. The heads can be adjusted to any position along the rails, and they have the spiral drive regularly employed by the builder. Ball thrust bearings are provided for the spindles and wear can be compensated for. Causing the rails to approach and recede from each other provides the feed and in ordinary operations this movement should be continuous, the number of strokes being so timed that the operator can remove and replace the work while the plungers holding it are withdrawn. An automatic stop is provided to disengage the feed at the back end of the stroke, while the feed can be thrown in or out at any point by a double ended foot treadle.

Spark Plug and Wrench.—A wrench which combines in one a number of different devices has been recently placed on the market by J. H. Williams & Co., Brooklyn, N. Y. The box end of the wrench is adapted for a ½-in. spark plug and the open end for a tire lug, a ⅝-in. standard cap screw, a ⅜-in. A. L. A. M. standard nut and cap screw and a 9-16-in. set screw, thus giving considerable range of capacity with relatively few openings.

Hydraulic Pipe Flanging.—A new pipe flanger employing the cold hydraulic process is being developed by the Patterson-Allen Engineering Company, 2 Rector street, New York City. The machine is automatic in its operation and will flange bent and straight pipe equally well. It does its work rapidly, having a capacity of between 250 and 300 8-in. flanges per day.

Electric Motors.—The Reno-Kaetker Electric Company, Cincinnati, Ohio, has developed a line of direct current motors embodying a number of new features. Probably the most important of these is the fact that the speeds have been designed to correspond to those of 60-cycle alternating current motors, five different speeds, namely, 600, 720, 900, 1200 and 1800 rev. per min. being available. This is a decided advantage where motors are to be used for driving machine tools, as heretofore there have been no standard speeds for direct current motors. The gearing on machine tools is generally designed for operation by an alternating current motor, and when a direct current machine is used a special gear has to be designed to meet the requirements of each individual case which has resulted in a greatly increased cost of production.

Woodworkers' Vise.—The Emmert Mfg. Company, Waynesboro, Pa., is placing on the market a new vise for woodworkers, which is rapid in action and possesses a new type of locking device that is operated by turning the vise handle or lever about a quarter turn. This device operates on a screw having a full thread and engages a case hardened ⅝-in. square steel lock rod placed within 3-16 in. of the main screw of the vise. The lock rod passes through a nut and is gripped on two sides. A triangular toothed wedge of hardened steel is also contained in the nut and operates against an angle in the nut so that when the main screw of the vise is turned to the right the nut moves forward and the angle in the lower part of the nut lifts the wedge into engagement with the grip rod. After the wedge has been forced into this position the nut becomes rigid with the grip rod, and is to all intents and purposes a part of the rear vise jaw. The screw then passes through the nut, drawing the front jaw inward against the work to be held. A tilting or angle jaw is provided for holding taper or wedge like shapes. A wood pad form can be attached to the angle jaw, and if a greater angle is desired this pad can also be of the wedge shape.

Pistol Rifling Machine.—The Pratt & Whitney Company, Hartford, Conn., has recently developed a pistol rifling machine capable of accommodating any style of barrel up to 10 in. in length. The machine is entirely automatic in operation, and when once set requires but little attention other than supplying the necessary work. As two barrels can be operated upon at once its production capacity is greatly augmented. In the design care has been taken to make the various operating mechanisms as simple as possible and to locate them in the most accessible manner. The lead for the rifling is obtained in the same manner as in the maker's other machines. The traveling action of the head is positively and accurately controlled, and an exceptionally rapid quick return reduces the idle time to a minimum.

Internal Thread Gauge and Tool Setter.—William Avery & Co., Foxboro, Mass., are making a device that enables one to reset internal threading tools of the customary types, after they have been reground, easily. The tool has two V's separated from each other by exactly 1 in. One is a male V, which engages the internal thread and the other is a female V turned in the rod. When the former meshes with the internal thread and the tool is set to the latter, the tool will catch the thread correctly if it is not fractional. The customary thread gauge also forms a part of the device.

Radius Gauge and Pliers.—Two recent additions made by the L. S. Starrett Company, Athol, Mass., to its line of small tools are a radius gauge having two sets of leaves and pair of pliers having a wide range of adjustment. One of the two sets of leaves in the former has concave ends and the other convex, thus enabling the radii of surfaces of these formations to be measured. Two sizes of tool are manufactured, one having 26 leaves for measuring radii varying by 1-64 in. from 1-16 to ¼ in. and the other having 32 leaves for radii from 17-64 to ½ in. In adjusting the pliers the lower jaw can be moved either in or out by turning a knurled worm that engages a rack cut on one side of the jaw. As the handles are pivoted to each other and move in unison, they are always the right distance apart for the hand to grip. The jaws have a capacity for pieces ranging up to 1¼ in. and can be adjusted to grip either a straight or a taper surface evenly. The gripping power of the tool is considerable, as the pivoted jaw has a short fulcrum.

A Universal Oil Stone Slip.—Through a most annoying inadvertence an article was published in *The Iron Age* of February 2 crediting a new product, a universal oil stone slip, to the Norton Grinding Company, Worcester, Mass. This product is made by the Norton Company, also of Worcester. The Norton Grinding Company is a manufacturer of grinding machinery, while the Norton Company makes Norton grinding wheels of Alundum and oil stones.

The Detroit Core Machine.—Augustus N. Kelley, foundry superintendent of the American Blower Company, Detroit, Mich., has applied for patents on a new type of core machine which is very simple and is also adaptable for making all kinds of cores. It is claimed that with this machine any man who is able to shovel sand can make a core. The sand is rammed by jarring, the core box and plate are rolled over and the box drawn from the core without the operator moving from his position, the necessary power being produced by the pressure of his foot on a treadle. One of the special features of this machine is that the core box can be taken off and another substituted in a very short space of time, or if the core boxes are small two or more can be attached at once.

Trade Publications

Decimal Equivalents.—The Garvin Machine Company, Spring and Varick streets, New York City. Wall hanger measuring 30 in. square. Gives a list of the decimal equivalents of fractional parts of an inch. These vary by sixty-fourths and are arranged in four columns. The figures are ⅝ in. high, and are printed in black on a contrasting background, which makes them easily read.

Automatic Screw Machine Work.—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. The piece is one of two diameters threaded with different pitch screws and with a knurled head. Illustrations show the operations performed in each of the four positions in the machine. There are nine operations performed in the four positions. The thread is cut during the other operations, but at the correct speed for the size, pitch and material. It does not retard the forming and other operations, where high spindle speed is essential to accuracy and rapid production. The sample is offered as typical of work possible on the Acme automatic multiple spindle screw machine.

Rock Drill Accessories.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 9003. Describes and illustrates the complete line of drill mountings and steam hose, drill steels and other accessories usually entering into a complete rock drilling equipment, which the company is prepared to furnish. Tables giving the sizes, weights and prices of the equipment are included, and a reprint of an article on the use and care of rock drill bits from the *Mining and Scientific Press* completes the bulletin.

Steam Turbines.—De Laval Steam Turbine Company, Trenton, N. J. Catalogue A. Size 6 x 9 in.; pages 120. Devoted to single stage turbines with and without gears, but various questions relating to other types are briefly discussed. The adaptability of this turbine for all kinds of service and the results of tests showing its economy and steam consumption are included. The construction of the De Laval turbine is fully described, and its special features, such as the safety groove which allows the buckets to be thrown before the wheel itself will rupture and the safety rings embracing the hub of the wheel, are pointed out.

Elevator Controllers.—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Booklet. Pertains to the Schureman line of elevator controllers, which are made for both direct and alternating current. The various types are illustrated and described, and space is given to various accessories.

Frogs, Switches and Crossings.—L. A. Green Company, Park Building, Pittsburgh, Pa. Catalogue No. 25. Illustrates different types of frogs, switches and railroad crossings, switch stands, connecting rods, lever catches, rail braces and other products for railroad equipment. Instructions are given for ordering. Tables are presented showing the tonnage of rails in the various weights per mile of track, and also the fastenings per mile for different lengths of rails. The catalogue is very complete.

Electric Pyrometers.—The Bristol Company, Waterbury, Conn. Bulletin No. 130. Size 8 x 10½ in.; pages 56. Illustrates and describes both the indicating and the recording types of the William H. Bristol electric pyrometers, and calls attention to their special features, among which is an automatic compensator which makes the readings independent of any atmospheric changes at the cold end of the thermo-couple.

Portable Elevator.—The New York Revolving Elevator Company, Jersey City, N. J. Bulletin No. 10. Gives general description and specifications for the Revolvator portable tiering machine, which can be wheeled to any place in a storeroom or warehouse and used for stacking barrels, boxes, bales, &c. In use the box or bale is placed on an elevating platform, which is raised by a crank and gears. Two double gears are provided, one for high speed and the other for low. The capacity of the elevator when operating with the high speed gear is 800 lb. and 1500 lb. when the low speed gear is employed.

Marine Gasoline Engines.—Grimm Mfg. Company, 39 Erie street, Buffalo, N. Y. Devoted to a line of two and four cycle marine gasoline engines for medium duty and high speed. The construction of the engines is described at length, and this is followed by illustrations and brief specifications of the different sizes. The line comprises three four-cycle engines with two, four and six cylinders, respectively, and 12 two-cycle engines having from one to six cylinders.

Electric Lighting.—The Holophane Company, Newark, Ohio. Loose leaf catalogue. Calls attention to the various types of glass reflectors and globes for electric lamps which this company is prepared to furnish. The different styles are illustrated and described with tables of the various kinds of lamps recommended for each and a price-list. Curves showing characteristic distribution of light with the various reflectors and globes are included.

Direct Current Electrical Apparatus.—Fairbanks, Morse & Co., Chicago, Ill. Bulletin No. 25. Gives in simple language the definitions of electrical terms and describes the construction and uses of the various types of direct current apparatus. The bulletin is gotten up in the form of a catechism with questions and answers, and many of the latter are supplemented by illustrations.

Cranes.—Northern Engineering Works, Detroit, Mich. Catalogue No 25. Treats in a condensed form of the different kinds of cranes made by this company. The various types shown include electric traveling cranes of several sizes and designs, hoists, hand-power traveling cranes and jib and pillar cranes. All of the various styles are illustrated, and in addition, there are a number of views showing typical installations.

Oxy-Acetylene Welding.—The Linde Air Products Company, Buffalo, N. Y. Pamphlet. Relates to the use of the oxy-acetylene process for cutting and welding metals, and shows several samples of work done. Space is given to the process of manufacturing the oxygen and generating the acetylene. Views of stationary and portable acetylene generators are given, as well as of the plant where the oxygen is manufactured.

Pile Driver.—The Browning Engineering Company, Cleveland, Ohio. Catalogue. Deals with a self-propelling railroad pile driver for either straight or batter piles. This machine is of the steam driven revolving type, and can be operated over the line at a speed of approximately 6 miles per hour. One of the special features of the pile driver in addition to its ability to drive batter piles is its reach, which is 19 ft. in front of the leading truck wheels and 28 ft. from the center of the track when driving piles on either side of the right of way. For transportation over the road the hammer and leads can be lowered in approximately 1½ minutes. An illustrated description of this machine appeared in *The Iron Age* February 23, 1911.

Electric Drive.—General Electric Company, Schenectady, N. Y. Two bulletins. No. 4784, superseding No. 4665, is devoted to the electric drive in pulp and paper mills. The advantages to be derived from the use of electric power are set forth, and descriptions of a number of important installations are included. No. 4785 points out the advantages to be secured from employing electric motors in woodworking plants. The bulletin illustrates and describes the electric motor as a part of woodboring machines, drills; band, circular, jig, rip and swing saws and planers.

Drill Press.—Colburn Machine Tool Company, Franklin, Pa. Bulletin No. 43. Illustrates and describes a 24-in. heavy duty drill press with a compound table, an illustrated description of which appeared in *The Iron Age*, September 22, 1910. A record of tests made with Celfor drills on this machine is also included.

Steel Specialties.—The P. Wall Mfg. Supply Company, 718 Preble avenue, Pittsburgh, N. S., Pa. Catalogue. Treats of a line of steel specialties which include brazed steel and copper plated oilers and torches, steel gongs, galvanized steel ice cans and sheet metal specialties. The oilers are made in various sizes and styles for bench and engine use. The special advantages claimed for them are great strength due to the use of brazed joints and freedom from leakage. In addition to the different articles shown in the catalogue the company is prepared to furnish special sizes and shapes as may be required.

Calendar.—The Worth Brothers Company, Coatesville, Pa., manufacturer of steel plates and sheets for boilers, tanks and boiler tubes, has issued an annual calendar. The various plants of the company are illustrated in the upper portion, and a pad with large figures occupies the remainder.

Metal Working Machinery.—Prentiss Tool & Supply Company, 115 Liberty street, New York City. Loose leaf catalogue. Illustrates and describes a complete and varied line of tools and machinery adapted to the use of high speed tool steels. Practically all of the tools have a single page devoted to each particular one, the illustration being given in the upper portion while a description or brief table of specifications occupies the remainder. All of the standard makes are shown, and a general index enables machines to be located easily.

Steel Window Sash.—The Detroit Steel Products Company, Detroit, Mich. Catalogue. Size 9½ x 12 in.; pages 36. Describes Detroit Fenestra solid steel window sash for manufacturing plants, machine shops and other industrial construction. Joints, sections, standards and near standards are described and illustrated, and dimensions and details are given so that provision for the use of the sash may be made in the preparation of building plans. Instructions for erection are also given. There are numerous illustrations showing industrial buildings equipped with the sash.

Foundry and Platers' Supplies.—Frederic B. Stevens, Larned and Third streets, Detroit, Mich. Catalogue. Size 6 x 9 in.; 700 pages. Concerned with an extensive line of supplies for foundries and plating establishments. Each of the articles is illustrated and described and is accompanied by a table of sizes and prices. Among the various lines covered are facings, core compounds and binders, cupolas, ladles, rammers, flasks, flask equipment, molding machines pattern shop equipment and supplies, molders' tools, brass melting furnaces, crucibles, core-room equipment, tumbling mills, pneumatic tools and accessories, fans, industrial railways and platers' supplies and equipment. Valuable suggestions, tables, formulas, &c., for foundrymen and platers are also included.

The Machinery Markets

Inquiries and orders continue to increase in the machinery trade. Some especially good business was placed in the New York market during the week and more is in sight. In Chicago machinery houses are bidding on a list calling for an outlay of $25,000, which has been issued by the International Harvester Company, and the Union Pacific Railroad has issued inquiries for requirements necessitating an equal expenditure. The demand for second-hand machinery in that market is in excess of the supply, and used machines in all sections are increasing in value. A decided improvement is noted in Cleveland, where inquiries for cranes and steel plant equipment are occupying the attention of the trade in addition to a few small lists of tools. Foundries making machinery castings are busy in Cincinnati, and a better call for machinery of all kinds and particularly for drilling machinery and lathes is noted in that territory. Water works development and other municipal improvements have increased the machinery demand in Texas. In Detroit a better volume of orders is coming in for all lines than at any other time this year. A good single tool business has been booked in San Francisco, and there are prospects of some excellent sales of mechanical equipment for the Mare Island Navy Yard. Special can machinery for delivery to the packing plants along the Pacific coast is being sold in good quantities by San Francisco machinery houses. Conditions continue rather quiet in both St. Louis and Philadelphia. In the latter market, while the demand is not up to normal, it is better than during February. The export trade continues noticeably good. Some good inquiries for machine tools are being distributed and New England metal working machinery manufacturers are bidding on a large lot of heavy machinery for a Japanese account.

New York

NEW YORK, March 8, 1911.

Scattered inquiries for diversified lines of mechanical equipment are coming into the New York machinery market in better volume than at any time last month, which is a surprise to even the optimistic machinery men, as there was a lull last week that made it appear to some that the buying movement was off for a time. In addition to this some excellent orders were placed during the week. The Simms Magneto Company closed for a large part of the machine tool equipment for its new plant at Watsessing, N. J., and it is estimated that the company has spent about $100,000 in this market during the last four weeks. The New York, Ontario & Western Railroad Company has not closed out for its extensive list issued several weeks ago, but supplementary inquiries indicate that the business will be placed in the near future. The call for woodworking equipment has increased, and automobile builders are asking for small lots of tools. The Eastern steel plants have placed some good sized orders in this market of late for conveying machinery and charging apparatus. Foundrymen in this vicinity note an increased demand for machinery castings, and at least two large plants have increased their business 10 per cent. within the last 30 days. Stocks of some classes of machine tools in dealers' hands are getting low and makers are being urged to hurry shipments.

The Terry & Tench Company, iron and steel structural contractor, whose plant is at Lexington avenue and 131st street, New York, has bought a 20-acre tract of land on the Newark meadows, New Jersey, fronting on the Passaic River, on which it proposes to build a large fabricating plant. Plans have been made to erect seven buildings, which will include a structural shop, 80 x 210 ft.; a large machine shop, blacksmith shop, template room, boiler house, engine house and storerooms. A large traveling crane will be installed in the main building. Other additions to the plant will be made as they are needed. The company will fabricate its own material for the construction of the buildings, and arrangements have been made for machinery covering its immediate needs.

John Riddell, mechanical superintendent of the General Electric Company, Schenectady, N. Y., has sent out inquiries for machinery calling for the expenditure of at least $18,000 to be installed in the lighting arrester laboratory of Union College of Schenectady. The list includes one 14-in. x 8-ft. lathe and one 11-in. x 5-ft. lathe, one sensitive drill press, one 20-in. upright back geared drill, a combination milling and drilling machine, one saw table, one jacksaw, one double end tool grinder, one saw bench and one wood finisher. The equipment is required for early delivery.

The Crucible Steel Company of America has requested the town of Harrison, N. J., to turn over to the company several unimproved streets in the vicinity of its plant at Harrison in order to allow for the construction of several additional manufacturing buildings. The company has prepared plans for structures which will cost about $600,000 to be built on property abutting on the streets, and it desires to extend its entire plant over the area. A request has been made that a price be set upon the property, and the town officials have asked $23,000 for its land, and exact a guarantee that the property will be used for building purposes only. The acceptance now rests with the directors of the steel company.

Bids will be received March 15 by the New York State Commission of Lunacy, in the capitol at Albany, for the equipment of an electric generating plant for the State Hospital at Poughkeepsie, N. Y. Included in the requirements are feeders and transformers, motors and a general line of power equipment. The total surety required is $20,000, and specifications can be obtained from T. E. McGarr, secretary of the commission, who can be addressed at Albany.

The Twombley Motors Company, 220 East Fifty-first street, New York, is planning to erect a large plant for the manufacture of the Twombley touring car, auto trucks and delivery wagons. The company contemplated the purchase of about 15 acres of land in Baltimore. Inquiries for some of the desired machinery have been made in this market, but nothing has been bought as yet.

The Board of Water Commissioners of Westbury, N. Y., will receive bids March 20 on equipment for a water works installation for that town, which will include a 100,000-gal. tank, a steel tower, 164 ft. high, 58 gate valves, two deep well triplex power pumps, with a total capacity of 1,000,000 gal., two 35-hp. multiple cylinder vertical gas engines with gas producers.

Bids will be received March 21 by the Board of Water Supply of the City of New York at its offices, 165 Broadway, for installing a complete drainage equipment for unwatering the shafts and tunnel of the Rondout siphon of the Catskill aqueduct. A bond of $16,000 is required of the successful bidder, and it is specified that the work be completed within 18 months.

The Ideal Electric Vehicle Company has been organized under a New Jersey charter with an authorized capital stock of $250,000. Herman A. Tufel, Maplewood, N. J., is the principal incorporator.

The Pure Carbon Company, Wellsville, N. Y., is in the market for a large line of steel shafting, shafting couplings, post hangers, drop hangers, pulleys, leather belting, friction clutches, &c., in addition to one water pump, capacity not less than 480 gal. an hour, one water jacketed air pump, one oil pump to handle 80 gal. an hour and one belt shifter.

The Grain Storage Construction Company, Mutual Life Building, Buffalo, N. Y., will build a coal elevator, 1200 tons capacity, at Fairport, N. Y., for A. M. Loomis, and a coal elevator, 1000 tons capacity, at North East, Pa., for W. L. Stowe.

The Spalding Bros. Mfg. Company, North Rochester, N. Y., manufacturer of fiber board, &c., contemplates locating a new factory at North Tonawanda, N. Y., where an available site has been secured.

The Republic Metalware Company, Buffalo, N. Y., is adding to its plant at Republic and Alabama streets and the Erie Railroad, a building, 55 x 224 ft., to be used by its pickling department.

The Samson Mfg. Company has been incorporated at Buffalo, N. Y., and will establish a plant for the manufacture of wire ladders, fire escapes, &c. The incorporators are James J. Lanahan, J. L. Kenefick and Morey C. Bartholomew, 1104 Prudential Building, Buffalo.

The Union Cutlery Company, Tideoute, Pa., will build a new factory at Olean, N. Y. The building will be 40 x 130 ft.

The Camillus Cutlery Company, Camillus, near Syracuse, N. Y., is arranging to make a large addition to its

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factory and equipment to provide for a material increase in output.

The F. M. Curtis Company, Jamestown, N. Y., will build a two-story, 60 x 120 ft., addition to its furniture factory on Cheney street.

The Findlay Motor Company, Findlay, Ohio, has purchased the American Motor Truck Company and the Lockport Stamping Company of Lockport, N. Y., and will move the plants of both companies to Findlay, where they will be merged with the present plant of the purchasing company. The first named of the companies to be transferred manufactures freight trucks and the other mail boxes and other stamped metal articles.

O. Bryant & Sons Company, manufacturer of special and general machinery, 15 Bradley street, Buffalo, N. Y., is erecting and will equip a two-story brick machine shop at West and Fernwood avenues, that city.

M. J. Bernhard, manufacturer of bar fixtures, Buffalo, N. Y., is erecting a four-story and basement factory, 50 x 110 ft., on Jefferson street, near Genesee street. Considerable new machinery and equipment will be required.

Chicago

CHICAGO, ILL., March 7, 1911.

A general spirit of optimism seems to prevail in the machinery market. This is not due to the closing of any large contracts during the past week, but rather to a general feeling that seems insistent on betterment. The International Harvester Company is out with a list approximating $25,000, and the Union Pacific Railway with another which totals a like amount. Most of the business closed during the past week has been with small manufacturers. There is a demand quite in excess of the supply for good second-hand machine tools.

The Peerless-V-Belt Company, Chicago, has closed a contract with the Commercial Club of Cedar Rapids, Iowa, for the removal of its factory to that city. The company is having plans prepared and will commence work at once on the erection of a factory building, 100 x 200 ft., two stories, which will be rushed to completion. The authorized capital stock of the company will be increased to $300,000, the Commercial Club having agreed to take $50,000 worth of first mortgage bonds on the new plant. The company will purchase an entire machine shop equipment and will install a 60-hp. boiler for heating purposes. A number of motors will also be purchased.

The Foote Bros. Gear & Machine Company, 214 North Carpenter street, Chicago, manufacturer of metal and rawhide gears, has let contracts for a 30-ft. addition to its plant, three stories and basement. This will increase the company's floor space to approximately 30,000 sq. ft.

McDowell, Stocker & Co., Chicago, are now carrying in stock a complete line of Bardons & Oliver's turret machines.

The Minerallac Electric Company, Chicago, has increased its capital stock from $24,000 to $100,000.

The Central Locomotive & Car Works, Chicago, has been incorporated with $600,000 capital stock by Fred W. Craft, Alexander E. Arkin and David Jetjinger, 59 Clark street, Chicago.

An effort is being made in Tuscola, Ill., to secure the necessary money for the installation of a modern lighting plant.

The Stover Engine Works, Freeport, Ill., is preparing to enlarge its plant. A new foundry, which will double the present capacity, will be erected, also an addition to the machine shop, a fireproof pattern storage and a new building for the storage of castings.

Altorfer Brothers, Roanoke, Ill., will build an addition to their plant, 54 x 65 ft., two stories and basement, which they will equip with woodworking machinery, lathes, drill keyseaters, &c.

The Canton Heating & Foundry Company, Canton, Ill., recently organized to succeed the Savill-Chandler Company of that city, has taken over the plant formerly operated by that company, in which it is making extensive improvements with the expectation of having it in operation in about 60 days. The company proposes to manufacture heating boilers, radiation supplies and valves and do general foundry work. The company will require additional factory room and will seek the assistance of the Canton Commercial Club in erecting a new building.

The City Council of Eldora, Iowa, is planning the installation of an electric light plant.

The Decker Mfg. Company, Keokuk, Iowa, is erecting a new factory building, 50 x 140 ft., three stories. The company manufactures hardware specialties, and will move the equipment from its present factory into the new building about June 1. Additional equipment for the manufacture of special lines which the company will make will be added later.

Webster City, Iowa, is advertising for bids for the construction of an electric light plant at an estimated cost of $40,000. Bids will be opened March 21, and work on the building is to begin May 1.

The Citizens' Water Company, Burlington, Iowa, is planning extensive improvements to its water works system.

La Crosse, Wis., will spend $30,000 for improvements to its water works system.

The citizens of Antigo, Wis., are planning to install a new water works system.

The city of Anna, Ill., will install a water works system, consisting of a water tank and tower and all necessary appliances and machinery at a cost of $6500.

The Greenview Electric Light & Power Company, Greenview, Ill., has been incorporated with a capital stock of $10,000. The incorporators are James A. Brocken, A. H. Cleveland and John Larson.

The Fulton Electric Light & Power Company, Fulton, Ill., has increased its capital stock for the purpose of engaging in the manufacture of gas.

The Maple City Mfg. Company, Monmouth, Ill., has increased its capital stock from $30,000 to $150,000.

The Security Coal & Mining Company, Duquoin, Ill., has been incorporated with a capital stock of $30,000. The incorporators are M. L. Bowen of Duquoin; Jas. E. Rutledge, Wm. A. Lafont and others of St. Louis. The company will engage in mining coal.

The Peoria Washed Sand & Gravel Company, Peoria, Ill., has been incorporated with a capital stock of $5000. The incorporators are D. S. Brown, H. K. Patch and Wm. Swords, Jr.

The Rock Island Sand & Gravel Company of Rock Island, Ill., has increased its capital stock from $15,000 to $25,000.

The Buettner & Shelburne Machine Company, Terre Haute, Ind., is planning the erection of a large addition to its plant, which will require a large amount of special machinery for the manufacture of mining machinery.

The Genton Mfg. Company, Terre Haute, Ind., has plans prepared for the erection of a three-story factory building, which will be equipped with new machinery.

At a meeting of the directors and stockholders of the Haynes Automobile Company, Kokomo, Ind., it was decided to proceed at once to rebuild the factory which was recently destroyed by fire. It is understood that considerable new equipment will be purchased for the purpose of fitting up temporary quarters.

The Elliot & Reid Company, Richmond, Ind., has under construction a new warehouse, 175 x 300 ft., which will have a capacity of about 5000 tons. The building will be equipped with an electric traveling crane of sufficient capacity to handle about 200 tons of wire products in 10 hours.

Philadelphia

PHILADELPHIA, March 6, 1911.

A somewhat better volume of business has been transacted by merchants in this district; manufacturers also report, in some instances, a slightly increased number of orders, although the demand generally is still much below the average. Inquiries are reported as being in better number, and from the nature of the demand the trade feels a trifle more encouraged with the outlook. Current orders are for the most part confined to single tool propositions, with a few exceptions, where moderate quantities have been taken, notable among which are the requirements of the Treadwell Engineering Company, for its new plant at Easton, Pa., which are now being contracted for. One or more small shop equipments have also been recently closed. The demand has not been confined to any particular class of equipment, the general range of shop tools being included in recent transactions. Better reports are being made by makers of special tools and machinery, and in some cases the volume of business taken during the past month has exceeded that for the same period last year. The railroad demand continues rather quiet.

The foundry trade reports quiet conditions, particularly where machinery castings are a factor. Steel castings have been quieter and few foundries in this district are running at anything like ordinary capacity. Prices are also understood to be in quite unsatisfactory shape. In the boiler and engine trade business continues to drag, particularly as far as equipment of any size is concerned. Second-hand machinery merchants have had a moderate volume of business offered and in a few cases fair sales have been made, but the demand is not up to the average.

McCaffrey & Farley, iron founders, Third street and Girard avenue, are having plans prepared for a new foundry plant, 40 x 144 ft., to be erected at 2314 and 2316 Washington avenue.

The Ford & Kendig Company, Callowhill above Broad

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street, has received bids for the erection of a two-story brick warehouse, 60 x 200 ft., to be built at Twenty-fourth and Wood streets, which will be used for the storage of fittings, pipe and supplies.

The contract for the erection of the new garage and subdelivery station for Strawbridge & Clothier, at the corner of Sixty-second and Locust streets, was awarded to John R. Wiggins & Co., contractors, who will begin work at once. Plans were by Savery, Sheets & Savery, and call for a reinforced concrete structure, three stories, 80 x 115 ft.

W. Hunter, chief engineer, Philadelphia & Reading Railroad, will receive bids until March 15 under contract No. 40, in connection with the work appurtenant to the abolishment of the grade crossings on the Port Richmond branch, for the reconstruction of the coal yards between Somerset street and Aramingo avenue, also under contract No. 55 for the erection of a trianmaster's office at Frankford and Lehigh avenues.

The Department of Public Health and Charities, city of Philadelphia, will take bids to-morrow for the installation of new boilers and repairs to old boilers, under item 41, at the Philadelphia General Hospital, and under item 44 for fireproof stairways in the Hospital Department. The amount to be expended under the former item is $15,000, while for the latter, $6000 is available.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for two heavy Mogul type standard gauge locomotives, also for a number of flat and box cars, dump cars and cabooses.

The Parkersburg Iron Company, Parkersburg, Pa., has recently installed additional equipment, including an Ajax Mfg. Company's upsetting machine, to be used for upsetting charcoal iron stay tubes, up to 4 in. diameter, this being particularly necessary in filling numerous orders for marine work. The company notes an improved demand for its product.

The Standard Novelty Works, Duncannon, Pa., will erect a two-story addition to its plant. The building will be 50 x 82 ft., and has been necessitated by the heavy demand for its line of Lightning Guider Sleds. On completion of the new addition this company will also manufacture a line of coaster wagons and other novelties.

The Royersford Foundry & Machine Company, Royersford, Pa., reports a very satisfactory demand for its line of power transmission machinery, although in punch and shearing machinery business has not been up to the average. Indications favor a better volume of general business.

The Link-Belt Company reports business in January and February to have been very good, more than twice as large in volume as that taken during the same months in 1910. The company's estimating department is fully engaged, and inquiries for practically all classes of work are coming out freely, that for coal handling machinery, however, being the most active. General business has also shown a material betterment. Among recent orders taken is one for a coal tipple of 300 tons hourly capacity, for the New River & Pocahontas Consolidated Coal Company at Minden, W. Va., and another of slightly less capacity for the New River Colleries Company at Eckels, W. Va. A coal handling plant will be installed at the Ninety-sixth street station for the Metropolitan Street Railway, New York, and a like plant furnished the Cambria Steel Company, Johnstown, Pa. Export business in sugar handling machinery has also been good. A marked demand for stone and fertilizer handling and special machinery is also noted, while that for its Maximum Silent high speed chain drive has been exceptionally good.

Cincinnati

CINCINNATI, OHIO, March 7, 1911.

The present conditions with the machine tool trade are so spotty that it is hard to form an opinion as to the actual situation. With but few exceptions, however, conditions are reported as improving and in a steady way. Lately manufacturers of drilling machines have experienced a little spurt in the demand, and the smaller sizes of lathes are also good sellers. Unless orders have been placed quietly, there has been no railroad buying here recently, with the exception of that already noted.

Local foundries are reported to be busier, and the manufacturers of woodworking machinery also note a continued improvement.

To manufacture and deal in machinery the Swing & Bickett Special Machine Company has been incorporated in Cincinnati, with $10,000 capital stock. The incorporators are A. J. Swing, C. A. Bickett, A. S. King, John C. Herrmann and W. B. Young.

The addition to the metal working plant of the Edwards Mfg. Company, Cincinnati, recently mentioned, will be 56 x 80 ft., two stories, and of steel and concrete construction. The building will be covered with the Edwards patent metal roofing.

Some large additions are planned for the Modern Foundry Company's plant in Oakley, and work will be commenced at an early date. Another Oakley factory will also be enlarged, and there is a rumor that a large new machine tool shop will be located there some time during the summer.

The new buildings for the Webster Mfg. Company, at Tiffin, Ohio, are well under way, and contract for the heating system was recently let to the American Radiator Company through its Cincinnati office.

It is rumored that the Dayton Steel Foundry, Dayton, Ohio, will make some large additions to its plant during the spring.

Work is progressing satisfactorily on the new large additions to the plant of the American Rolling Mill Company at Middletown, Ohio, and the company expects to have the mill in full operation before next fall.

Adam Benz & Son, machinists, Bank street and Central avenue, Cincinnati, have purchased the building occupied by them formerly under a lease, and it is reported will make some additions to their shop.

On February 28 fire destroyed the large garbage plant of the Cincinnati Reduction Company, in which was some valuable machinery. Plans are already under way for rebuilding. H. M. Chamberlain is president of the company.

To operate a sawmill the West Union Lumber Company has been incorporated at West Union, W. Va., with $25,000 capital stock. The incorporators are F. B. Lyons, C. H. Gifford, D. C. Watson and L. M. Scott of West Union, and W. B. Taylor of Smithfield, W. Va.

Thoms & Breneman, Cincinnati, have let contract to the W. F. Pothoff Construction Company, for an eight-story reinforced concrete building, to be erected at the corner of Ninth and Sycamore streets. It is understood the building will be used for light manufacturing purposes.

The R. K. Le Blond Machine Tool Company, Cincinnati, has been distributing a very valuable handbook for mechanics and engineers, and the demand for this book has exhausted the supply. The Le Blond Company also gave to the National Metal Trades Association visitors, entertained at its plant last week, a very beautiful souvenir, showing the officers of the association as well as different views of Cincinnati, and of the company's plant in East End.

New England

BOSTON, MASS., March 7, 1911.

While the volume of orders in machinery lines is not increasing to any marked extent, reports received by the builders should afford much encouragement. It seems probable that the railroads will not be influenced unduly by the rate decision. Eastern visitors to the Middle West bring back bright reports of manufacturing conditions in those States, especially among the automobile builders. Some of the managers frankly state that they have been fooled as to the condition of their market and curtailed production too greatly. With some grades of cars a shortage is prophesied. Some of the large builders of high grade cars are rushing preparations for producing 1912 models. This change is already reflected to some extent among the manufacturers of machinery specially sought by the automobile people, and among the producers of accessories, parts and materials. As to the last named element, the builders had large stocks in hand when the depression struck them and these will have to be worked off before their buying becomes brisk.

Some of the builders of heavy machinery have received inquiries from the Japanese Government for large lots of tools. Other smaller miscellaneous lists are coming out soon.

The Uncas Specialty Company, Norwich, Conn., has purchased the Rochester Machine Tool Company and the Sterling Lubricator Company, both of Rochester, N. Y., and will move the equipment to Norwich. The corporation will hereafter be known as the Sterling Machine Company. The Uncas Company manufactures automobile accessories; the Rochester Machine Tool Company, the Acme double cylinder engine, a type much used in automatic stokers, and the Buckley boiler, which supplies this class of engine. The Sterling Company makes an automatic lubricator for steam engines. In concentrating the manufacture of the several lines at Norwich the Uncas plant will be increased, though details are not yet available. The equipment already owned in the several factories will be augmented by some new machinery. The company has increased its capital stock from $50,000 to $100,000. Frank S. Jerome, Norwich, is the president; Frank W. Browning, Norwich, treasurer, and A. K. Paul, Boston, clerk.

The Hendey Machine Company, Torrington, Conn., manu-

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facturer of machine tools, has increased its capital stock from $600,000 to $900,000. The works are running 60 hours a week with a full operating force. Some machinery is being put into stock.

The Springfield Mfg. Company, Bridgeport, Conn., manufacturer of grinding machinery and abrasive wheels, has brought out a new line of dry grinders. Three sizes are regularly manufactured, having wheels respectively 12 x 2 in., 18 x 2 in. and 24 x 3 in.

The Gardner Central Foundry Company, Gardner, Mass., has put on the market a six-wheel grinding machine, designed for woodworking shops and other similar establishments, for grinding molder knives, cutters, drills and other tools where different shapes and grades of wheels are necessary. It is furnished equipped either for belt or motor drive.

The Union Twist Drill Company, Athol, Mass., manufacturer of twist drills and cutters, will build an addition, 40 x 80 ft., one story.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., is making very important improvements to its works, a process which has been in progress for some time and which will continue until the entire armory is modernized to the highest degree. The great buildings are ample for the purpose of the business, but are now practically all occupied by its departments. Much new equipment has been purchased, much of it special, and more will be added from time to time in the immediate future.

The upper floor of the new factory building which will be erected by Landers, Frary & Clark, New Britain, will be given over to offices. The remaining stories will be used for manufacturing. The structure will be 50 x 360 ft. and seven stories.

The New York, New Haven & Hartford, New York Central and Boston & Maine railroads and the city of Springfield, Mass., are making plans for costly improvements in that city. The plans, just issued by William Barclay Parsons, the engineer of the Massachusetts Railroad Commission, call for the expenditure of $11,500,000, including a bridge across the Connecticut River to cost $615,000, four new lines for the New York, New Haven & Hartford, two on each side of the river; the remodeling of the Union Station, the abolishing of certain grade crossings and other important improvements. The bridge specifications call for 8,750,000 lb. of steel. The track specifications will be large.

The Springfield Foundry Company, Springfield, Mass., has awarded the contract for its new foundry on Pasco street. It will be of steel and concrete, 100 x 150 ft., one story.

The R. P. K. Pressed Metal Company, Bridgeport, Conn., manufacturer of pressed metal goods, is increasing its equipment by the addition of a heavy Waterbury-Farrel press. The works are running to fullest capacity, in spite of the fact that the increase in manufacturing facilities has been constant during the past two years. Much new machinery has been installed and a model toolroom has been created. The company makes a specialty of difficult draw die work up to moderately large sizes. The management reports a brisk demand from a wide variety of industry, inquiries being especially numerous.

Additions to general manufacturing plants include: United States Finishing Company, Norwich, Conn., three-story brick factory, 130 x 158 ft., the plans calling for other additions later; J. H. McIlroy Son & Co., North Monmouth, Maine, blankets, four-story factory, 75 x 200 ft.; Bartelow Bros., Chelsea, Mass., tanners' extracts, four-story brick and cement factory; Salts Textile Mfg. Company, Bridgeport, Conn., addition 75 x 120 ft., one story.

Cleveland

CLEVELAND, OHIO, March 7, 1911.

The general machinery market shows a decided improvement in the volume of inquiries in some lines, particularly in cranes and steel plant equipment. Orders in these lines have picked up somewhat, and manufacturers of cranes feel that most of the new inquiries are of a character that will result in the early placing of orders. There is a fairly good demand for locomotive cranes. Builders of industrial cars and locomotives also report a good volume of orders. In heavy handling machinery the market continues quiet. The demand for steam engines, which has been quiet for some time, has become fairly active. Some good orders have been placed within the past week or two, and a good volume of inquiries has come out. Engine builders report a constantly increasing demand for heavier units adapted for higher steam pressure, the higher pressure in many cases now being regarded as more economical. It is stated that five years ago 150 lb. was about the highest pressure asked for, but now buyers are frequently asking for engines for a pressure of 180 to 200 lb.

In machine tool lines the market remains about stationary. A few lists of a half a dozen tools have come out, but buying is mainly in single tools. The machine tool list for the new Lake Shore Railroad shops in Elkhart, Ind., which was expected early this year, has not yet come out, and the indications are that it will not be issued within the next 60 days.

The Bishop & Babcock Company, Cleveland, manufacturer of soda water fountains, beer pumps and allied lines, has absorbed the Becker Company, Chicago, maker of similar products. The name of the consolidated company has been changed to the Bishop-Babcock-Becker Company, and its capital stock has been increased from $4,500,000 to $8,500,000. K. D. Bishop, president of the Bishop & Babcock Company, will serve the new company in the same capacity, and L. A. Becker, head of the Chicago company, will be vice-president. The Bishop & Babcock Company has recently greatly enlarged its Cleveland plant, has rebuilt its Indianapolis plant and is building a new plant in Dallas, Texas.

The Cleveland & Pittsburgh Coal Company, Cleveland, has completed plans for the erection of a new coal and coke handling plant, to be erected at Lakeside avenue and East Thirty-eighth street, and contracts will be let shortly. In addition to the ground storage, there will be 16 bins with a total capacity of 250 tons. The bins will be of concrete reinforced with bars and expanded metal. There will be 16 sets of gates, shoots and screens. The coal will be handled with a gantry crane with 120-ft. span and 20-ton bucket. Bids have already been received for the crane, motors and trolley.

At a meeting of the stockholders of the National-Acme Mfg. Company, February 25, it was decided to secure authority to increase the capital stock from $1,500,000 to $2,500,000. Only a portion of the new stock will be issued for the present. The increase is due to the larger investment caused by the recent extensions to the Cleveland plant and the building of a plant in Montreal, Canada, for the manufacture of screw machine products. The Canadian plant is practically completed and will be placed in operation in about two weeks.

The National Screw & Tack Company, Cleveland, was authorized at a meeting of its stockholders, February 25, to increase its capital stock from $1,461,000 to $1,711,000. The increase will be made in a common stock issue of $250,000, increasing the common stock to $1,250,000. The new stock will be distributed among the stockholders as a dividend, as it represents earnings that have been put into the plant.

The Aluminum Pump Valve Company, Cleveland, has been incorporated with a capital stock of $20,000, to manufacture a new pump valve. The company is located at the plant of the Industrial Pattern & Bronze Company, 988 East Sixty-seventh street. James E. Householder is the manager. Some machinery equipment will be purchased.

Joseph T. Ryerson & Son, Chicago, have opened a district office and display room in Cleveland in the Western Reserve Building, corner of Superior avenue and West Ninth street. They will shortly have on display a large line of general machinery and specialties. L. E. Skinner is manager of the office.

The Ideal Stamping & Mfg. Company, now located at 1555 Columbus road, Cleveland, will move to a new plant at Bessemer avenue and the Cleveland & Pittsburgh Railroad. This company and the Gorham Mfg. Company, which is engaged in a similar line of work, will be combined. The Ideal Stamping & Mfg. Company has recently incorporated with a capital stock of $10,000. J. G. Roquett is the manager.

A committee of the stockholders of the Bucyrus Steel Castings Company, Bucyrus, Ohio, has reported favorably on a plan to consolidate that company and the Carroll Foundry Company in Bucyrus. The formation of a new company with a capital stock of $500,000 will be formed if present plans are carried out.

With a capital stock of $40,000 the Great Lakes Welding Company, Cleveland, has been incorporated by Henry R. Swartley, George R. Hall, Arthur L. Betts and others.

The Board of Public Service, Cleveland, will receive bids March 15 for electrical equipment for a traveling crane at the Kirtland pumping station.

The erection of the new plant of the Great Lakes Engineering Works at Ashtabula, Ohio, is progressing rapidly. The seven buildings are under roof and will soon be ready for the installation of machinery. It is expected that the dry dock will be ready for operation July 1 and the shipbuilding plant October 1.

The Bremen Mfg. Company, Bremen, Ohio, recently incorporated with $50,000 capital stock, is erecting a factory building, 35 x 150 ft. The company will manufacture caloric pumping machinery, and will install about $5000 worth of equipment. The officers of the company are: Will S. Turner, president; C. D. Hoskins, vice-president; H. M. Shelhamer, secretary and treasurer.

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St. Louis

ST. LOUIS, MO., March 6, 1911.

Business among machine tool dealers was rather quiet the past week, though some report February a satisfactory month. Dealers look forward to a period of moderate business movement.

The Brown Shoe Company has let contract for a new seven-story factory building to cost $100,000.

The Jeanne D'Arc Mfg. Company, maker of valves, &c., will remove to Belleville, Ill., a suburb of St. Louis, and contract for a new building there has been let. It has also bought a plant in Louisville, Ky.

The St. Louis Car Company is now getting its affairs into good shape, and the plant will be running with its full force of about 5000 men in the course of a week or 10 days.

The Moon Motor Car Company is extremely busy and unable to catch up with its orders.

The Igou Motor Car Company has been incorporated with a capital stock of $6000 by S. C. Igou and associates to do a general garage and agency business at Grand and Cass avenues. Mr. Igou has been for several years superintendent of the Moon Motor Car Company.

The several manufacturers of motor boat engines here are all very busy. St. Louis has within the last few years become quite a center for the manufacture of gasoline motors of this type.

Business in the woodworking machinery industries is gradually picking up, as reported by the Hall & Brown Wood Working Machinery Company, maker of planers and matchers and a large line of other saw mill and planing mill equipment.

The W. H. Putnam Lumber Company, St. Louis, has been incorporated with a capital stock of $25,000. The incorporators are Chas. Stark, Victor E. Rhodes, W. H. Putnam and others. The company will engage in the manufacture of building material.

The Imperial Clock Company, now located in Granite City, Ill., has purchased a site on Forest Park boulevard and will erect a new factory to accommodate its increasing business. G. Gorlander is the president. The new factory will cost upward of $50,000.

The plant of the Heinann-Miller Mfg. Company, 1819 North Seventeenth street, was destroyed by fire March 2, causing a loss estimated at $45,000 on stock and fixtures and $6000 on the building. The company manufactures showcases and store fixtures.

The Elliot Frog & Switch Company has taken a railroad contract for 800 frogs, and finds the outlook improving.

The town of Warren, Ark., proposes to erect a 200-ft. bridge over the Saline River.

It is reported that the Otis Elevator Company, St. Louis, is negotiating with the Board of Trade at Little Rock, Ark., with a view to opening a branch office in that city.

Detroit

DETROIT, MICH., March 7, 1911.

Industrially as well as in a weather way March came in like a lion. The past week has seen a general spring awakening in practically all lines. Spring orders have poured in as in no other week this year. R. B. Jackson, manager of the Hudson Motor Car Company, states that the week has been one of the most phenomenally prosperous periods that the motor car industry has seen in the last three years. Saturday morning his company received orders for the immediate shipment of 400 cars.

The latest among Detroit's motor accessory industries is the Renfro's Speed-o-Meter Company, which manufactures a contrivance designed to place a check on the owner's car in his absence. It gives an accurate report each day of every movement of the car, each trip, every start and all speeds attained for every minute of the 24 hours.

The $8,000,000 bond issue authorized by the Michigan Railway Commission will allow the Pere Marquette to spend $2,000,000 in improvements. The Toledo division will be double tracked for a distance of about 40 miles. Yard trackage will be increased to about 100 per cent. Saginaw will have a new warehouse, Harbor Beach a new roundhouse and Ludington many yard improvements. A number of divisions will receive new stations as well as general improvements.

The Standard Foundry Company of this city increased its capital stock from $40,000 to $100,000. With new capital it is intended to enlarge facilities to meet the requirements of its trade.

The Modern Machinery & Engineering Company, composed of Detroit stockholders, was organized last week with a capital stock of $25,000. Thomas G. Ahern, who is the principal stockholder, has the company's affairs in hand.

Each week sees an addition to Detroit's motor car industry. The Kinsey Motor Car Company is the name of a new concern. Articles of incorporation were filed last week with a capital stock of $150,000. Solomon W. Kinsey holds the office of president.

Organized to manufacture motor engines the Morton Motor Company was incorporated last week, with Chas. N. McNaughton as president. Mr. McNaughton is prominently identified in financial circles.

The Peninsular Car Seal Company, Benton Harbor, Mich., organized to make car seals, the invention of J. C. Davis of that city, has filed articles of incorporation with the State Secretary.

A stock company has been organized at Mt. Clemens to take over the old Wolcott mill property, which has been in the hands of a receiver. The company has a capital stock of $45,000, and its organization is in the hands of Wm. F. Edmunds, president of the New Haven Savings Bank.

The Bates Tractor Company plans to complete its plant by April 1. The new factory is a frame building and covers 40 x 250 ft. So far three carloads of machinery have been ordered, scheduled to arrive by March 15. More will be ordered as it is needed. A machine shop, 56 x 65 ft., is to be built in connection with the factory, to be equipped with appliances for repairing purposes.

At the spring elections Marquette electors will vote on the proposition to bond the city for $100,000 to build two dams on the Dead River. The dams will be for the purpose of increasing the water power and generating capacity of the public lighting system.

Harrison, Mich., will spend $7800 for improvements to its water works and lighting plant, if the small bond issue passes at the spring election.

The National Chicory Company will build a branch plant at Kawkawlin, Mich., in the spring. Plans for the building are being prepared by the company's engineers at Flushing, N. Y.

Plans have been completed for an addition to the building of the Lieberman Trunk Company, Saginaw, Mich. The building will be used as a factory to care for the extra demands of the company.

Big Rapids will vote on the issuing of $100,000 in bonds to be used in securing the location of new industries.

The Clarke-Carter Automobile Company, Jackson, Mich., has increased its capital stock from $100,000 to $250,000.

A vinegar plant is to be built at Lowell, Mich., by John Kellog. The plant will be 40 x 70 ft., with two stories above basement, and will have 24 generators.

The Cadillac Handle Company, Cadillac, Mich., will erect a complete chemical plant in conjunction with its factory, to use up the large amount of waste material it now sells for stove wood.

The old Beers table factory of Marine City, Mich., has been taken over by Langely & Dale of this city. The factory will be rebuilt and will be used for the manufacture of automobile parts.

The Leisen & Henes Brewing Company, Menominee, Mich., will erect a new ice plant of 50 tons daily capacity.

The Johnson Furniture Company, Grand Rapids, Mich., will erect a four-story factory adjoining its present plant. The old building will be used in conjunction with the new.

The Standard Oil Company will erect storage plants at Bay City, Mich., to cost around $150,000. The deal has been pending for some time, and is received with considerable satisfaction at Bay City. It is also stated that an immense cooperage plant will be built after the erection of storage tanks is completed.

The Northern Brick & Tile Company, operating at Reavie, Mich., is preparing to largely increase its plant capacity. Three kilns and one giant clay digger are among the improvements.

The D. F. Poyer Company, Menominee, Mich., has been organized to manufacture a particular type of automobile designed by D. F. Poyer.

The Hailey Carriage Company, Tecumseh, Mich., will be reopened by Frank J. Hailey, son of the former manufacturer. The plant will undergo numerous improvements and will be modernized in every way.

The Citizens' Light & Power Company, Adrian, Mich., is in the market for a new boiler of 500 hp. capacity, and a smoke stack of complementary hight. Official action will be taken in a few days relative to the purchasing of new machinery.

Members of the executive force of the Lozier Motor Company, formerly of New York City, are fast arriving at the new factory in this city. The factory has been completed and 80 per cent. of the machinery has been transferred.

Flint has secured the new Standard Rule Company

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which was incorporated a short time ago. The company has a capital stock of $25,000.

The Dodge Chemical Company is the name of a new addition to the chemical plants of this city. The company has a capital stock of $25,000.

The City Engineer of Kalamazoo, Mich., has been directed to secure estimates for the construction of a municipal lighting plant.

The South

LOUISVILLE, KY., March 7, 1911.

The attitude of the railroads in the matter of purchases is giving local manufacturers of machinery something to think about. As yet there have been no direct indications as to what change, if any, will be made in railroad plans regarding purchases. One large order, which was bid on several weeks ago by boiler manufacturers all over the country, has not yet been acted on by the railroad affected, though what the reason is is not known. It is reported on good authority from another source that the most important railroad operating in this territory has given orders that all purchases, which heretofore have been made on the approval of the purchasing agent, will be required to be submitted for approval to higher officials before being authorized.

Manufacturers of smoke consumers will be able to market their devices to better advantage in the South, as many municipalities have taken up an active campaign to reduce smoke emission. The Board of Trade of Louisville is working on this project, while Nashville and Knoxville, in Tennessee, have strict ordinances under consideration. In this connection the formation of the National Smoke Preventer Company, at Louisville, is of interest. It will sell a smoke preventer manufactured by L. H. Long, a local launderer. W. P. Davis, sales agent for a number of iron and steel companies, is interested in the project. Agents will be appointed in a good many cities.

C. J. Walton & Sons are installing three boilers having a combined capacity of 1000 hp. in the rolling mill of the Ewald Iron Company, Louisville.

The Peter-Burghard Stone Company, Louisville, is considering the addition of some new machinery in its cut stone department.

The George Panke Company, Louisville, will install a polishing machine in its monument works.

The Tycrete-Concrete Products Company has been organized in Louisville with a capital stock of $35,000 by C. D. Moody, H. A. Collins and A. M. Rutledge. It will manufacture a plastic cement dressing, and will establish a plant in the immediate future. C. D. Moody is the principal stockholder.

The Barringer-McKnight Company has been incorporated in Louisville with $25,000 capital stock, to manufacture harness and saddlery.

Louisville men are interested in the Great Southern Oil & Mining Company, which is developing several hundred acres of oil and gas lands in Tipton County, Tenn. The company, which has headquarters at Covington, Tenn., is now receiving bids on its equipment, including pumps, drills, &c.

The Health Officer of Louisville will confer this week with proprietors of slaughter houses in the interest of having a modern abattoir constructed for general use.

George L. Smith has purchased a controlling interest in the Cadiz Water Company, Cadiz, Ky., terminating a stockholders' fight which has been on for several months. Mr. Smith has become president of the company, and is planning improvements in the plant.

Activity in the Bowling Green limestone district of Kentucky is interesting quarry machinery manufacturers. The Tegart Stone Company has been organized at Bowling Green with $10,000 capital stock by John F. Tegart, James C. Tegart and James H. Wilkinson, and will operate quarries, while the Kentucky Limestone Company has also been organized at Bowling Green with $12,000 capital stock. Cleveland, Ohio, capital is largely interested, H. B. Brackenridge, C. H. Felton, R. H. Felton and John W. Smith included. The company has already purchased a large part of the machinery it will need in operating quarries, 700 acres having been leased. It is also announced that plans are being made for the establishment of a cut-stone plant in Bowling Green to handle the output of some of the quarries.

Andrew J. House and C. F. Chenault are leading a movement to establish a tobacco factory at Richmond, Ky. A building has already been secured.

Gebhardt & Norris, Augusta, Ky., will erect a flour mill at Maysville, Ky. A site for the mill, for which equipment will be purchased at once, was given free by the Business Men's Club of Maysville.

H. H. Chapman, Pembroke, Ky., is organizing the Pembroke Milling Company, which will take over the Pembroke Roller Mills. Extensive improvements in the plant will be made, it is stated.

Evansville, Ind., officials have inspected the water works of Paducah and other western Kentucky towns and have announced that a new plant will be constructed in that city.

Additions to the equipment of the Straight Creek Coal Company, Cary, Ky., are to be purchased. Prices are now being asked on gasoline motors.

Work has been begun by the Jones Machine Company, Chattanooga, Tenn., on a foundry adjoining its present plant. The foundry will have a complete equipment, including a traveling crane, and will make gray iron castings exclusively.

The DeLoach Mfg. Company, which manufactures sawmills, is apparently in a quandary as to the location of its plant. It was originally located at Atlanta, and later established at Bridgeport, Ala. It decided to leave there, however, and to return to Atlanta, but negotiations which have been on with the Business Men's Club of Memphis, Tenn., indicate that the plant will be established there.

The Fidelity Investment Company has been formed at Nashville, with $200,000 capital stock and $100,000 surplus. The construction of electric railroads, electric power houses, &c., is given as the purpose of the corporation. H. H. Mayberry of Nashville is one of the principal stockholders.

The Lonsdale Water Company has been organized at Lonsdale, Tenn., to construct a plant following the creation of a franchise which has been asked for. Alex McMillan is to be president of the company, which will have $75,000 capital stock, and will begin action as soon as the franchise, an ordinance creating which has already been introduced in the Council, is disposed of.

Following the authorization of a bond issue of $20,000 by the Legislature, Manchester, Tenn., is preparing to erect an electric light plant and water works.

Direct current generators and motors for haulage, as well as a pump to be used in its machine shops, will be purchased by the Darby Coal Mining Company, Knoxville, Tenn., which is operating mines at Darby, Va. Other improvements will be made, the total outlay being $25,000. C. H. Thompson is manager of the company.

An electric light system will be built at Lynnville, Tenn., by the Lynnville Mill & Elevator Company. The same company is remodeling an old mill and installing new machinery.

The electric light plant to be built at Jackson, Tenn., by the municipality will be new. The old plant will not be utilized in its construction. R. L. Beare is making arrangements for the city.

It is reported that new shops will be built at Memphis, Tenn., by the 'Frisco lines, which are said to have secured a site for that purpose. The cost of the investment will be $300,000. The railroad is planning the erection of a steel viaduct at Otey street in Memphis.

The Eastern Tennessee Power Company, Ducktown, Tenn., has increased its capital stock from $3,750,000 to $4,000,000.

A. C. Foster is president and L. J. Haley, Jr., secretary of the Automatic Electric Railway Block & Signal Company, which has been organized in Birmingham, Ala. Articles of incorporation have been filed in Arizona.

Armour & Co. are to erect a modern plant in South Chattanooga, Tenn., at a cost of $75,000, it is reported. Refrigerating and other equipment will be needed.

William H. Day is organizing the Dixie Clay Products Company, at Graysville, Tenn. It will manufacture roofing tile, face brick, &c., and will construct a plant which will cost $45,000.

Additional machinery will be installed in the veneer mill of George L. Carter, at Johnson City, Tenn. The cost of the proposed improvement will be $4000.

J. P. Winn of the Chamber of Commerce of Chattanooga, Tenn., announces that a fireproof cabinet manufacturing concern is contemplating the establishment of a plant there.

W. O. Bunn & Co. are building a plant at Henry, Tenn., for the manufacture of washing machines. They are purchasing woodworking and power equipment.

The Nashville, Tenn., Electric Light Company will install a steam turbine and make other improvements in its plant.

The Cement Tile Machinery Company, Waterloo, Iowa, is to establish a branch office at Memphis, Tenn. W. L. Northrup will have charge of the office.

New interests have purchased the control of the Huntsville Gas Light Company, Huntsville, Ala., and will make extensive improvements in the plant. Philadelphia capital is now interested in the company.

The Queen & Crescent, which controls the Gadsden Car Works, Gadsden, Ala., is planning large extensions of the plant and the addition of several new departments which

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will require the purchase of considerable machinery. Four hundred cars a month will be the capacity when the improvements are completed.

The estimates of the artesian water department submitted to the City Commissioners of Memphis call for an expenditure within the next five years of $165,000 for miscellaneous improvements, including new boilers. The department also estimates an expenditure of $500,000 for new mains.

The sale of the machinery of the Knoxville Woolen Mills was held last week, and the equipment was disposed of to a large number of textile manufacturers.

Monticello, Ark., will rebuild its electric light plant which was destroyed by fire recently. Bids will be received on the equipment, including 16 x 72 in. return tubular boilers, 75 and 100 kw. direct connected alternating generators, with pumps and other necessary equipment, until March 15.

The Steere Home Construction Company, Shreveport, La., will purchase concrete machinery, including block machines and molds.

New equipment is to be purchased by the Standard Oil Company of Louisiana in connection with the enlargement of the company's refinery at Baton Rouge to a capacity of 5000 barrels a day. The equipment to be bought includes stills, both crude and steam, tankage, &c.

Sylvania, Ga., will build a water works plant. J. B. McCrary & Co., Atlanta, drew the plans for the plant. The municipality has taken over the' property of the Sylvania Water Supply Company.

Th city of Rutherfordton, N. C., voted the issuance of $35,000 in bonds for the construction of a water works and electric light system.

The New Orleans Furniture Mfg. Company, New Orleans, La., is considering the enlargement of its plant, but states that the matter is contingent upon the policy of the Levee Board, which exercises some control over its river front property.

The city of Smithfield, N. C., has voted the issuance of $55,000 in bonds for the construction of an electric light and sewerage system.

The Atlantic Compress Company, Troy, Ala., has bought the site from the Troy Compress Company, on which the compress was burned last November, and in a short time will erect a first-class compress plant.

Toronto

TORONTO, ONT., March 4, 1911.

The very fine weather has had a tonic effect upon trade and enterprise. Sunshine, a fairly high temperature and absence of storms are conditions seldom present as they have been this year in the latter days of Februafy and the early days of March. From the West come reports of spring plowing, and railroad contractors are making preparations for beginning the campaign of 1911 very early. Unless the promise of an early spring proves delusive, activity in building and all construction operations will have a start five or six weeks in advance of the time of year it usually commences. Large sums are held on deposit for many of the undertakings that are in hand or are projected. If the Western crops are got in early and have thus a chance to attain to a state of vigor before the hot season arrives, the effect will be good upon the spirits of all engaged in trade and industry, and will be sustaining of the general credit, which is expected to be freely used this year to raise money for various undertakings. Competition from outside countries grows in aggressiveness in the Canadian market. Americans are as keen as ever, British selling agents are much keener than ever, and German firms are pushing business here as they never did before. There is more business to be scrambled for and there is more scrambling for it. A veritable boom is opening in the Porcupine gold mining field of Northern Ontario, where large capital is being applied to test and work properties. Much machinery is now being ordered for that camp, and the Ontario Government is making the construction of its railroad thereto.

The Canadian Pacific Railway Company has called for tenders for the construction of 30 miles of the Kootenai Central Railway southward from Golden, B. C. In the prairie provinces the company's branch extensions alone will run into a total of 312 miles this year. Tenders for most of this construction have already been called for. According to an announcement made in Toronto by the company yesterday, the Canadian Pacific Railway will spend several millions this year on new work in Ontario—on new stations, freight buildings, yards, double tracking, track extensions and the laying of rails on sections of road now completed. Wooden bridges are to be replaced by steel structures.

As an indication of the state of business in Ontario and Quebec, railroad earnings are encouraging. Last month the Grand Trunk's earnings exceeded those of any former February in the road's history.

The Grand Trunk has placed orders with the Dunkirk Locomotive Works for 20 new engines.

The premises of the Ives Bedstead Company, Montreal, were damaged to the amount of $150,000 by fire on February 27. About 67,000 new beds were in the building.

At a mass meeting of the citizens of London, Ont., it was decided to open a manufacturers' investment fund, to be made up of popular contributions of $1 each, the price of a share in the fund, the money to be put in the hands of 10 trustees and by them used to secure sites and induce industrial concerns to come to the city and locate factories thereon.

It is expected that the turbines and generators will be installed in the power house at Sandy Falls, on the Mattagami River, Northern Ontario, next month. That will be a source of energy for working the mines of the Porcupine field.

E. H. Ford of the Ford Iron Company represents an English syndicate that proposes to establish a chain of summer hotels in Canada.

The Hamilton Steel & Iron Company's ore docks at Point Edward, Ont., are to be greatly extended, and an additional hoisting machine is to be installed there.

L. O. Armstrong, industrial agent of the Canadian Pacific Railway Company, was advised some days ago by the representatives of two large American concerns that were negotiating for the establishment of Canadian branches on the company's system that, pending the outcome of the reciprocity business, nothing further will be done in the matter.

The London Electric Company, London, Ont., is preparing to purchase a lot of new machinery.

The contract to build the Dominion Government steamer Bellechasse has been awarded to the Kingston Shipbuilding Company, Kingston, Ont. She is to be 130 ft. long and 27 ft. beam.

Several steel scows are to be built at the Western Dry Dock plant, Port Arthur, Ont., for the Great Lakes Dredging Company.

The Dewsley Spring & Axle Company, Chatham, Ont., has let a contract for a large extension of its works.

A linseed oil factory is to be built in Calgary, Alberta.

The Ontario Government is to float a new loan of $5,500,000. Some of the proceeds will be applied to the extension of the Government's railroad line, but almost the half of it will be turned over to the Hydroelectric Power Commission, which will spend $2,000,000 to extend its transmission line to Windsor and to other Ontario points.

It is announced that the Richardson Mica-Washer Works will be removed from Kingston, Ont., to Trenton, N. J.

The Grand Trunk will shortly begin the laying of 100-lb. rails on the double track line between Niagara Falls and London, Ont., in the place of the 80-lb. rails there now. Extensions are to be made to the company's telephone despatching service. This will call for between 250 and 300 miles of wire between Toronto and Sarnia. The Canadian Pacific Railway is also arranging for large extensions of its telephone despatching service.

Three boilers, an air compressor, a hoist and a complete five-stamp mill have been ordered from the Jenckes Machine Company, Sherbrooke, Que., by the Thelma Gold Mining Company, in Bryce Township, northern Ontario.

Road making by the British Columbia Government is calling for the purchase of machinery for the purpose.

Geo. F. Driscoll, Montreal, has formed a company there, with a capital stock of $100,000, to manufacture and sell the Herbst full light moving picture machines.

The British-Canadian Lumber Company, with a capital stock of $20,000,000, has been formed by a group of British, Canadian and American capitalists. Its headquarters are to be in Vancouver, B. C. It is to build several large mills in that Province.

The Dome Mining Company, Porcupine, Ont., has made arrangements for the erection of a 50-stamp mill, the first unit in a proposed plant of 200 stamps. It is expected that all the machinery of this 50-stamp installation will be in place this year. Machinery costing $250,000 is either already on the ground or forthcoming.

A company to make gasoline tractors is looking over the advantages of Chatham, Ont.

The Mayor of Medicine Hat, Alberta, says that the Lucky Jim smelting works, a wire nail factory, a glass plant, an artificial stone and marble industry, a foundry and machine shops will be established in that town in pursuance of arrangements entered into with the town.

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Seven million dollars will be expended by the Canadian Pacific Railway for irrigation in the Calgary district.

The Oliver Chilled Plow Works, South Bend, Ind., has completed plans for the erection of new buildings at its works in Hamilton, Ont. The plans comprise an assembly building, 90 x 375 ft., three stories; paint shop, 60 x 375 ft., three stories; office building, 60 x 100 ft., two stories. The foundry and remaining buildings included in the plans will not be erected until 1912. The machinery to be installed will consist largely of rough grinding wheels and small drill presses. There will be a few special machines, including thread rollers, riveters and punch presses.

San Francisco

SAN FRANCISCO, CAL., March 1, 1911.

Very few of the orders recently placed with local dealers have included any notable number of machine tools, and from the nature of current inquiries it is evident that few of the shops around San Francisco require any great increase of equipment. Purchases of single tools, however, are more numerous and often individually larger than during the fall, and the movement of small shop equipment to country points is very satisfactory for this time of year. There is some business in prospect from the Government navy yard at Mare Island, but it is practically certain that no very important purchases will be made this year.

Railroad interests are buying few tools at present, but there is a prospect of considerable business later in the year and a large amount of general equipment will be required for new railroad construction. Nothing very definite is known of the plans for double tracking the mountain section of the Union Pacific, but it is believed that work will be started this year, and dealers handling steam shovels, pneumatic tools, &c., look for a number of orders on this account. The Southern Pacific has taken bids on a new substation for its electric railroad system in Berkeley, and the first shipment of cars for this system has just arrived. To eliminate a curve on this line the railroad is endeavoring to secure a right of way through the foundry of Dalton & Sons in Oakland.

Figures are being taken by the United Railroads of San Francisco for a new shop and car barn on Geneva street. This company is now getting in a large number of new cars which were ordered last year.

The Santa Fé is planning extensive improvements to its terminal facilities at Richmond, Cal., and it is announced that the capacity of its car shops will be greatly increased this spring.

Cannery equipment forms a comparatively small item, but a good many orders have recently been placed by both fruit and salmon packing interests. Sanitary can machines especially are in demand. The Alaska Packers' Association will put in about 14 of these machines this season. This concern has had a small steamer and several gasoline boats built, and has ordered a lot of S. F. Standard marine gas engines for shipment to its stations.

The Natomas Consolidated of California has purchased a 3½-yd. Bucyrus drag line excavator, equipped with a variable dumping device, for reclamation work in the Sacramento Valley.

The San Francisco Merchants' Association is greatly interested in the recent purchase by the city of New York of 500 street flushing machines, and is working for the purchase of similar equipment by this city.

The Union Iron Works recently installed its forge shop in a new building and has added a new 7000-lb. hammer.

The Geo. E. Dow Pumping Engine Company has just completed a vertical triplex double acting pump, with a daily capacity of 4,000,000 gal., to be used for orange irrigation in southern California. This company is also building a deep well pump of large capacity for the oil fields, to be driven by a gas engine.

The Mountain Quarries Company, whose plant is near Auburn, Cal., is preparing to install a machine shop.

A meeting of the creditors of the G. W. Price Pump & Engine Company, San Francisco, will be held March 2. In a statement to the creditors the company places its assets at $133,047 and liabilities at $76,065, but admits its inability to meet its obligations as they become due. As it is believed that further continuation of business under local conditions would offer no relief, the company proposes to turn over its properties to the creditors.

The Golden State & Miners' Iron Works, San Francisco, is working on a clam shell dredge for the Vulcan Dredging Company, to be used in levee work on the Sacramento and San Joaquin rivers. The bucket capacity is 6 yd., and as a whole the dredge is said to be the largest of which there is any record.

The recently organized Union Construction Company, with offices in the Atlas Building, is working on a contract for a large gold dredge, to be shipped to Alaska in April. The hull is being built at Seattle.

A number of inquiries for steam shovels have come out recently, and while little or no actual business has been done, the outlook in this line is considered good.

The Chicago Pneumatic Tool Company was the lowest bidder on two direct connected gasoline air compressors for the lighthouse service, the bid being about $3000.

Plans have been made for a large addition to the Bakersfield, Cal., Iron Works, which is preparing for a busy year in oil well machinery.

A. W. Fairfield of the Stockton, Cal., establishment of the Holt Mfg. Company has left for Salt Lake City to establish a branch office.

The Hansen Combination Tool Company has been incorporated at Sacramento, Cal., with a capital stock of $150,000, by R. P. Hansen, J. G. Bamber, J. H. Tibbetts, C. E. McLaughlin and Ralph Brown.

The Oakland Gas Light & Heat Company will start work shortly on a large central steam heating system in the business district of Oakland.

Bishop & Co., large candy manufacturers, have purchased machinery for a complete plant at San Diego, Cal.

The town of Colton, Cal., has placed orders for a lot of water works machinery, including compressors, air lifts and electric motors.

Libby, McNeill & Libby are installing an electric power plant and a lot of ice machinery at their milk condensing plant at Ferndale, Cal.

The Union Dredging Company has completed plans for a dredge to be used near Folsom, Cal.

The Bendixsen Shipbuilding Company, Eureka, Cal., has contracts for three lumber steamers to be built this spring, machinery for which will be purchased in San Francisco.

A lot of new machinery has been purchased for both departments of the Valley Ice & Laundry Company, Hemet, Cal.

The Exchequer Mining & Power Company is planning to rebuild its power plant near Merced, Cal., which was badly damaged by a recent flood.

The American Can Company has just completed a large concrete building for its plant at Honolulu, T. H.

The National City Lumber Company, National City, Cal., has purchased several woodworking machines and electric motors.

The Rodney Burns Redwood Novelty Company, Eureka, Cal., is preparing to install a number of new woodworking machines.

The Pacific Basket & Barrel Company is installing a box and veneer package factory at Lodi, Cal.

The Terry Lumber Company is planning to rebuild its box factory at Chico, Cal.

Contracts have been let for the installation of water works for the town of Gerber, Cal. An electric light plant is under consideration.

The Phœnix Lighting Fixture Company has secured quarters for a manufacturing plant at Los Angeles.

The Hanford Water Company, Hanford, Cal., has let a contract for a pumping plant to F. C. Roberts of San Francisco.

The Southern Pacific Railroad is planning the installation of a pumping plant near Suisun, Cal.

Louis G. Henes, coast representative of Manning, Maxwell & Moore, is expected back from an Eastern trip about March 5.

The city of Ellensburg, Wash., will improve its lighting plant at an expenditure of $30,000.

The Warman Steel Casting Company, Los Angeles, Cal., has under construction at Redondo Beach, Cal., a foundry building which will soon be ready for the erection of furnaces and the installation of machinery.

The Gypsoil Company, recently organized at Los Angeles, Cal., is planning the erection of a large plant at Moapa, Nev., which will call for an expenditure of from $55,000 to $125,000 for machinery, details of which are being prepared by the engineers. M. J. Bouse, 917 Story Building, Los Angeles, is general manager.

The Southwest

Rollins & Westover, Beals Building, Kansas City, Mo., have plans prepared for an electric light plant for Monnet, Mo.

The City Council of Diller, Neb., is planning to install a $15,000 water works system.

The City Council of Liberty, Neb., is planning the installation of an electric lighting system.

Salpupa, Okla., has disposed of bonds in the sum of $260,000, recently voted, and will use the proceeds to improve its water works system and street paving.

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Work will be commenced in the near future by Waukomis, Okla., for the construction of an electric light plant, a vote having recently been taken by the citizens of that city on the proposition.

The Oklahoma Spring Bed Company, Muskogee, Okla., has been organized and expects to have a factory in operation in about 60 days.

The Okeene Commercial Club, Okeene, Okla., has closed a deal with capitalists of Oklahoma City for the installation at Okeene of a salt plant that will cost approximately $150,000, with a capicity of 1500 barrels per day. An ice plant will be operated in connection with it. It is understood that the necessary equipment has not been purchased.

Plans are being completed to erect at Wichita, Kan., a large terminal grain elevator. It will have a capacity of 700,000 bushels, and be equal in hight to a seven-story building. The cost, according to the Kaufman-Boyle Grain Company, proprietors, will be between $100,000 and $125,000. Work will be started soon.

The Ponca City Mill & Elevator Company's plant at Wakita, Okla., was destroyed by fire February 28, causing a loss of $12,000, partially covered by insurance.

The Nelson Grain Company, Kansas City, Mo., has bought a site on the Belt Line tracks at Thirtieth street and Fairmount avenue, on which a new three-story grain mill will be erected, with the requisite warehouse room, involving an investment of about $87,000.

The Cliffwood Mining Company, Joplin, Mo., has let the contract for a 200-ton electric mill to be built on shaft No. 2 of the Clifford property. The mill will be operated by electrically driven motors. The electric hoist is to be one of the newest types, and is the first of its kind to be installed in that district. Cliffwood No. 1 is to be rebuilt and electric motors installed. B. L. Van Hoose is the manager.

The Kansas City Rock & Sand Company, Kansas City, Mo., has been incorporated. The capital stock is $5000. The incorporators are J. T. McGrew, Henry McGrew and Geo. Grindle.

The Honniwell-Calvin Iron Company, Kansas City, Mo., has increased its capital stock from $100,000 to $200,000.

Texas

AUSTIN, TEXAS, March 4, 1911.

Machinery dealers report an increased demand in their various lines. The public utilities improvement movement is growing and plans are on foot for the establishment of a number of new water works and sewer systems and electric light and power plants. Many of the existing public utility concerns are to be extended and improved.

The Legislature has enacted a law granting the county of Galveston the right to sell or lease a right of way for an electric or steam railroad over or on the sea wall that has been constructed along the Gulf. This sea wall is about five miles long.

E. C. Robinson, St. Louis, Mo., is arranging to install an electric light and ice plant at Crystal City, Texas.

Elmer S. Farwell, Orange, Texas, is promoting the establishment at that place of a large mill for the manufacture of lumber from yellow pine. He is connected with the yellow pine paper mill that is already in operation at Orange.

The Bay Shore Traction Company, Houston, Texas, will begin the construction of its proposed interurban electric line that is to run from South Houston to La Porte within the next 90 days.

J. C. Ward, Waco, Texas, and associates are arranging to install a 20-ton ice plant at Jasper, Texas. Local capital is also interested in the project.

J. W. Horton, Shiro, Texas, will install a water works plant and distributing system at that place. The water supply will be obtained from an artesian well.

The Price-Booker Company, San Antonio, Texas, will establish a large vegetable canning factory and pickling plant at Smithville, Texas.

W. B. Walker & Sons will greatly enlarge the capacity of their canning factory at Austin.

The Dallas Street Railway Company, Dallas, Texas, has been organized with a capital stock of $20,000, for the purpose of maintaining and operating suburban railways. George W. Works, W. Leslie Williams and A. C. Moser are the incorporators.

The new plant of the Houston Brick & Tile Company that is being erected at Houston will have a capacity of 1,000,000 brick per month.

The City Council of Cameron, Texas, will spend about $15,000 for the construction of a sewer system for that place.

Steps have been taken to erect a cotton seed oil mill and install an ice plant at Hutto, Texas. Among those interested are R. E. L. Miller, Charles Hanstrom, W. H. Farley, A. B. Walling and John Busch.

H. P. Rhodes, Houston, Texas, and associates will install a water works plant and distributing system, an electric light plant, an ice plant and bottling works at Alvin, Texas.

G. Denton, who is locating a colony of farmers upon his 16,000-acre tract near Asherton, Texas, will erect a canning factory, which will have a daily capacity of 20,000 cans. Both vegetables and meats will be tinned.

Fred Sutton, Little Rock, Ark., and associates are reported to have selected Sanderson, Texas, as a location for their proposed factory for the manufacture of wax from the candelilla plant.

A. G. Walker, Hondo, Texas, and associates have taken preliminary steps toward the organization of a company with $30,000 capital stock for the installation of an ice factory at that place.

The Texas & Pacific Railroad will install a pumping station at Kent, Texas. The water will be brought from a point four miles west of Kent through a pipe line.

The City Council of Snyder, Texas, has let the contract for the construction of a complete sewer system for that town.

The Taylor Cotton Seed Oil Works, which operates the cotton seed oil mill at Taylor, Texas, is to be reorganized and the plant enlarged and otherwise improved.

The Keith Lumber Company will rebuild the planer and box factory at Voth, Texas, recently destroyed by fire, entailing a loss of about $40,000.

T. O. Henry, Roswell, N. M., will establish a large creamery at Plainview, Texas.

The Mission Cotton Oil Company, which was recently organized with a capital stock of $60,000, will establish a cotton seed oil mill, a water works plant and distributing system and an electric light plant at Mission, Texas.

The Tioga Gravel Company, which was recently organized with a capital stock of $200,000, will install a plant for washing and screening gravel at Tioga, La. Among those interested in the enterprise are C. L. Dwyer, George K. Force, K. C. Barkley and A. D. Anderson of Houston, Texas, and E. S. Brasher of Tioga, La.

The City Council of Tucumcari, N. M., is considering the question of purchasing the local water works plant and distributing system. A price of $50,000 has been set upon the property, it is stated.

The National Railways of Mexico will soon begin the erection of shops at Irapuato, State of Guanajuato.

The Mexico Traction Company of the city of Mexico is having surveys made for its proposed interurban electric line that is to be constructed between that city and Puebla, 160 miles. The construction work will be started in a short time. It is reported that the company also contemplates constructing an interurban electric line from the city of Mexico to Cuernavaca, about 75 miles.

The Guanajuato Power & Electric Company, Guanajuato, Mexico, is very active at this time in the installation of irrigating pumps on farms in the central part of the State of Guanajuato. In the vicinity of Silao transformers and motors to operate the irrigation pumping plants are being installed on a number of farms by the company under the direction of Pablo Rocha, local manager. The country all through the agricultural portions of the State is dotted with newly-built transformer houses and electricity for both light and power is being furnished the people of the rural districts.

George M. Howat will erect a plant for the manufacture of galvanized sheet iron, sheet tin and other iron products at Tampico, Mexico. He has obtained a concession from the Federal Government for the proposed enterprise. It is stated that about $500,000, gold, will be invested in the plant.

Herculano Cerda and Vicente Garcia Fuentes, Saltillo, Mexico, will install a hydroelectric plant near that city for the purpose of furnishing power and lights for the towns and industries of that region. The same men are promoting the erection of a cotton seed oil mill to cost about $1,000,000, Mexican currency, at Saltillo.

The Zinc Smelter Company, Saltillo, Mexico, will soon begin the erection of its zinc smelting plant.

W. H. Ellis, New York, and associates will erect a number of factories in Mexico for the manufacture of crude rubber from the palo amarillo tree under a concession which they hold from the Mexican Government.

The Legislature of Texas has passed a bill providing for the installation of a cotton goods factory at Rusk, Texas, to be operated by penitentiary convicts. An appropriation of $150,000 is made for the proposed plant.

The Bering Tire & Rubber Company, Houston, Texas, contemplates the erection of a plant suitable for the manufacture of heavy mechanical rubber goods and automobile accessories. Tentative plans call for a two-story building

THE MACHINERY MARKETS

with basement, the construction of which will begin in about three months.

The city of Jacksboro, Texas, will receive bids until March 15 for the construction of a water works system, for which $25,500 in bonds have been voted. N. Werenskiold, Flateau Building, Dallas, Texas, is engineer in charge.

Bids will be received March 21 by the Mayor and City Council of St. Augustine, Texas, for material required in the construction of a water works system, including electric motor or gasoline engine, triplex pumps, steam pumps, boilers, &c. The O'Neil Engineering Company, 1503 Praetorian Building, Dallas, Texas, is the engineer in charge.

An automobile factory is to be erected at Wichita Falls, Texas, from plans designed in Detroit, which call for two buildings, one 100 x 240 ft., and another 25 x 100 ft. The plant will be located at the junction of the Wichita Falls & Southern and Wichita Valley railroads.

The Missouri Ice & Fuel Company, San Antonio, Texas, will add to their equipment a 25-ton ice plant. A new artesian well, flowing 1,000,000 gal. daily, has just been brought in, which makes the enlargement possible.

The Orient Consolidated Pure Ice Company, Hantlin, Jones County, Texas, has been incorporated with a capital stock of $7500.

The Modern Ice Machine Company, San Antonio, Texas, has been incorporated with a capital stock of $30,000. The incorporators are W. G. Roloff, H. Zork and Chas. M. Dickson.

The Fort Worth Wagon Company, Fort Worth, Texas, has been incorporated with a capital stock of $15,000. The incorporators are Warren Heaton, C. Hightower and John F. Shelton.

The Alba Lignite Company, Dallas, Texas, has increased its capital stock from $15,000 to $30,000, and changed its name to the Alba Malakoff Lignite Company.

The Kaufman Ice Company, Kaufman, Texas, has been incorporated with a capital stock of $20,000. The incorporators are J. W. Singleton, P. C. Bacon, Geo. G. Shaw, and others.

C. J. Hardy, an engineer representing the firm of Ford, Bacon & Davis of New Orleans, contractors, has been investigating the situation at Austin with a view of making a proposition to the city on behalf of his principals for the reconstruction of the large dam across the Colorado River and the installation of a hydroelectric plant in connection with the proposed water storage reservoir.

The Nixon Ice Company of Nixon, Texas, is installing a water works system for that town.

The Board of Commissioners of Menard County have adopted plans for a new steel bridge that it will construct across the San Saba River, near Menard, at a cost of $20,000, bonds for which purpose have already been issued. The structure will be 1121 ft. long.

The town of Lubbock, Texas, has issued $55,000 of bonds for the construction of a sewer system and $25,000 of bonds for installing a water works plant and distributing system. F. E. Wheelock is Mayor.

The Gulf Coast Brick & Tile Company, Brownsville, Texas, recently closed a contract with the American Clay Machinery Company of Bucyrus, Ohio, for the installation of machinery at its plant for the manufacture of hollow building blocks and drain tile.

The Seguin Water Works Company, Seguin, Texas, will extend its water distributing system by laying 6000 ft. of 6-in. pipe, 2000 ft. of 4-in. pipe and 1000 ft. of 8-in. pipe. Twenty new fire plugs will also be installed.

The City Council has taken preliminary steps toward issuing bonds for the construction of a modern and complete sewer system for the town of Rockdale, Texas.

The Boards of County Commissioners of Llano and Burnet counties, Texas, will soon let the contract for the construction of a joint steel bridge across the Colorado River, connecting the two counties.

R. B. George of Houston, who recently purchased from George T. Allen large limestone quarries at Leander, Texas, will install machinery and make other improvements, with the view of increasing the output of stone.

The taxpayers of Rusk, Texas, have voted $18,000 of bonds for the installation of a water works plant and distributing system.

The city of El Paso is installing a new pumping plant, including a compressor and 125-hp. boiler. Ten additional wells, each to a depth of about 600 ft., will be sunk and 10 new fire hydrants installed.

Newton Sheppard is constructing a water storage reservoir near Tucumcari, N. M., and will install an irrigation pumping plant.

The Illinois Irrigation Company has let the contract to the Standard Construction Company for the construction of its proposed large system of irrigation near Farmington, N. M. The contract price is $480,000.

The City Council of Vera Cruz, Mexico, will install a cold storage plant in that city for the benefit of butchers and fishermen.

The Sautena Agricultural Syndicate, which is constructing a large system of irrigation in the State of Tamaulipas, Mexico, near Matamoros, has completed the first of a series of dams for creating water storage reservoirs. The main canal of the proposed system will be 96 miles long, and it will have several hundred miles of laterals extending to every part of a tract of land embracing 600,000 acres that is to be placed under irrigation by the syndicate. Large pumping plants will be installed. The main water supply will be obtained from the San Juan River. Antonio G. Canalizo of the City of Mexico is at the head of the project.

The Bishop & Babcock Company, Cleveland, Ohio, is opening up a branch warehouse at Dallas, Texas, and expects to erect a carbonic acid gas plant during the coming spring.

The Texas City Electric Light & Power Company, Texas City, Texas, has been incorporated with $100,000 capital stock, by R. C. Trube, F. M. Danforth and William Dossett.

Brady, Texas, will hold an election March 4 to vote on the question of issuing $40,000 in bonds for the construction of a water works system.

The Northern Produce Company, Cuero, Texas, will erect a fertilizer plant near its packing houses.

S. L. Gill and James Lagro, Raymondsville, Texas, contemplate, in the near future, putting in a water works system and installing an electric light plant. These parties have recently purchased large real estate holdings in the town.

Newport Rust-Resisting Iron.—The Newport Rolling Mill Company, Newport, Ky., at its exhibit last week at the Ohio Hardware Association convention at Music Hall, Cincinnati, had many interesting articles made from its Genuine Open Hearth Iron, a superior rust-resisting, anti-corrosive iron sheet adapted for places where an ordinary steel sheet does not give satisfactory service. Among them were the following: A metal house entirely covered with roofing and siding, a horseshoe and bars twisted and forged cold, garbage cans, pumps, elbows, shoes, conductor pipe and eaves-trough, stoves and ranges, boiler tubes, corrugated roofing and siding of all styles and description. Tests were conducted, showing its superior rust-resisting qualities over ordinary steel and iron. A recent large shipment of this product was made on order of the United States Government for use in the Philippines, it being adopted after a competitive rust-resisting test with various other makes of iron and steel.

The Reading Iron Company, Reading, Pa., announces that plans have been prepared for the reconstruction of its Ninth street mill. It will be of steel frame, and work is expected to be started during the early summer months. The present mill was erected by the Philadelphia & Reading Railroad Company in 1868, and was used for years by that company for the manufacture of rails. In 1889 the plant was remodeled by Cofrode & Saylor and structural shapes manufactured. The Reading Iron Company subsequently took over the property. The new puddling mill near the Oley street mill is nearing completion. The Roe mechanical puddling process will be installed in this mill. Reports that the Reading Iron Company would engage in the manufacture of steel are without foundation.

The Western Hinge & Mfg. Company, Brookfield, Mo., has been organized with $25,000 capital stock to succeed the Twentieth Century Hinge Company. The company has under consideration the selection of a location, a number of propositions having been offered it by different cities. It will manufacture a general line of builders' hardware and expects to have its factory erected and ready for operation by January 1, 1912.

The Buckeye Engine Company, Salem, Ohio, recently sold a 150-hp. engine to Eliott & Co., Pittsburgh, manufacturers of steam water heaters and steam specialties. The latter firm is also installing a 10-ft. boring mill in its machine shop for work on the larger sizes of feed water heaters.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅝ in. round and square; 1⅛ to 4 in. x ⅜ to 1 in.	₩ lb 1.75¢
1⅛ to 4 in. x ¼ to 5-1	₩ lb 1.85¢
Rods—⅜ and 11-16 round and square	₩ lb 1.85¢

Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.00¢
3 in. x 3-16 in. and ⅛ in.	2.25¢
1½ to 2½ in. x ⅛ in.	2.10¢
1½ to 2½ in. x 3-16 in. and thicker	2.00¢
1 to 1¼ in. x 3-16 in.	2.10¢
1 to 1¼ x ⅛ in.	2.20¢
⅞ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ⅛ in.	2.45¢
½ x 3-32 in.	4.25¢

Tees:	
1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.35¢
3 in. and larger	2.05¢
Beams	2.00¢
Channels, 3 in. and larger	2.00¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.55¢	2.80¢
Nos. 18 to 20	₩ lb 2.70¢	2.90¢
Nos. 22 and 24	₩ lb 2.75¢	3.00¢
No. 26	₩ lb 2.80¢	3.10¢
No. 28	₩ lb 2.95¢	3.30¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½¢

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 12 and 14	₩ lb 2.95¢
Nos. 22 to 24	₩ lb 3.30¢
No. 26	₩ lb 3.50¢
No. 28	₩ lb 3.80¢

No. 20 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 6.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24	₩ 100 sq. ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.80	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.65
IX, 14 x 20	7.90
A. Charcoal:	
IC, 14 x 20	$5.60
IX, 14 x 20	5.70

American Coke Plates—Bessemer—

IC, 14 x 20	107 lb	$4.50
IX, 14 x 20		5.50

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.70
IX, 20 x 28 with an 8 lb. coating	10.70

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 21¢

Brazed Brass Tubes—

List August 1, 1908. 19½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14½¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14½¢ ₩ lb

Brass Wire—

List August 1, 1908. 14½¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 13½¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ₩ lb 47½@47¾¢

Copper—

Lake Ingot	₩ lb 14¾@15 ¢
Electrolytic	₩ lb 14¾@15¢
Castings	₩ lb 14¼@14¾¢

Spelter—

Western ₩ lb 6¼@6¾¢

Zinc.

No 9, base, casks ₩ lb 6 ¢; Open ₩ lb 6½¢

Lead.

American Pig	₩ lb 5 @5½¢
Bar	₩ lb 6½@6¾¢

Solder.

½ & ½, guaranteed	₩ lb 28 @28½¢
No. 1	₩ lb 26 @26½¢
Refined	₩ lb 24½@25 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb ..@9½¢
Hallett's	..@9¢
Other Brands	..@ ¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in lots for remelting ..@..¢

Rods & Wire Base Price 31¢

Sheets Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.75@11.00
Copper, Heavy and Wire	₩ lb 10.50@10.75
Copper, Light and Bottoms	₩ lb 9.50@9.75
Brass, Heavy	₩ lb 7.00@7.25
Brass, Light	₩ lb 5.50@5.75
Heavy Machine Composition	₩ lb 9.25@9.50
Clean Brass Turnings	₩ lb 7.00@7.25
Composition Turnings	₩ lb 8.25@8.50
Lead, Heavy	₩ lb ..@3.75
Lead, Tea	₩ lb ..@3.50
Zinc Scrap	₩ lb ..@4.00

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Our Catalog shows what styles to use. Our book, "File Filosophy," tells how best to use them.